

New or Noteworthy Bornean Plants.

(PART I.)

BY ELMER D. MERRILL

Director, Bureau of Science, Manila.

In January, 1918, I finished the manuscript of my "Bibliographic Enumeration of Bornean Plants" in which nearly 5000 species of flowering plants are recorded from Borneo, and which was recently published by this Society. In the interim comparatively little attention was given to the Bornean flora, merely such material being worked up as was submitted to me for identification by the Conservator of Forests at Sandakan.

Previous to my departure for the United States in 1920. co-operative arrangements were perfected between the Bureau of Science and the Forestry Service of British North Borneo, whereby it became possible to send Mr. Maximo Ramos, botanical collector of the Bureau of Science, to Sandakan for the purpose of prosecuting field work in botany in British North Borneo. Mr. Ramos devoted approximately three and one-half months to field work in the immediate vicinity of Sandakan, from September to December 1920. In this time he collected 827 numbers of flowering plants and ferns, for the most part with ample duplicate material. On my return to Manila in the early part of 1921, I commenced a study of this material, finding approximately 700 species represented in the collection, of which nearly 100 have been found to represent previously undescribed forms, including three new generic types. In addition to these new species, numerous previously described ones not hitherto known from Borneo are also represented in the collection. Considering the fact that the entire collection was made at low altitudes and in the immediate vicinity of Sandakan, the percentage of novelties is unusually high. It is merely an excellent illustration of how little we know regarding the Bornean flora.

The present paper is largely based on the material secured by Mr. Ramos in 1920 in British North Borneo, but various species are also described from material secured by other collectors both in British North Borneo and in Sandakan. Small collections made by Major J. C. Moulton in Upper Baram in 1914 and 1920 have yielded interesting novelties. In the present paper 104 species are described

* Journ. Straits Branch Roy. As. Soc. Special Number, pp. 1-637. September. 1921.

as new, while 58 previously described forms are recorded for the first time from Borneo. Three new genera are described, *Fissipetalum* of the Olacaceae, *Jussiaea* of the Menispermaceae, and *Woodiella* of the Anonaceae. The list of species common and confined to the Philippines and Borneo has been increased by *Dinochloa pubiramea* Gamble, *Mapania affinis* Merr., *Dioscorea flabellifolia* Prain & Burkill, *Phacelophrynum bracteosum* K. Schum., *Polyalthia dolichophylla* Merr., *Dehaasia triandra* Merr., *Erodia bintoco* Blanco, *Santiria samarensis* Merr., *Dichapetalum holopetalum* Merr., *Actephila dispersa* Merr., *Cleistanthus megacarpus* C. B. Rob., *Omphalea bracteata* Merr., *Iodes philippinensis* Merr., *Eugenia palawanensis* C. B. Rob., *Strychnos ignatii* Berg., and *Solanum epiphyticum* Merr. In addition to the three genera described as new, mentioned above, the following genera are hitherto unrecorded from Borneo: *Phacelophrynum*, *Illigera*, *Cnestis*, *Actephila*, *Iodes*, *Actinidia*, *Taraktogenos*, and *Clidemia*. Including the species described as new and those previously described forms now credited to Borneo for the first time, the present contribution (published in two parts) adds a total of 162 species to the list of those known from Borneo.

Bureau of Science Manila, P. I.

November 15, 1921.

PANDANACEAE.

Pandanus Linnaeus f.

Pandanus sandakanensis sp. nov. § *Rykia*.

Frutex circiter 3 m. altus; foliis coriaceis, circiter 1.75 m. longis, 3 cm. latis, tenuiter acuminatis, nitidis, margine acute serratis, costa subtus in partibus superioribus serratis; syncarpiis 3 ad 5, ovoideis vel ellipsoideis, confertis, in spica dispositis, 6 ad 8 cm. longis; drupis numerosis, 1-locellatis, induratis, 2 cm. longis, circiter 1 cm. latis, angulatis, deorsum angustatis, alte connatis, apice convexis, stylo abrupte terminatis; stylis induratis, obliquis, 4 mm. longis et latis, nitidis, plerumque 2-dentatis.

A shrub about 3 m. high. Leaves coriaceous, shining, smooth, about 1.75 m. long, 3 cm. wide, the midrib somewhat impressed on the upper surface, prominent on the lower surface, smooth except in the upper part and beneath where it is finely toothed; the lateral nerves slender, obscure, about 30 on each side of the midrib, the margins rather coarsely and sharply toothed in the lower part and with much more numerous, smaller, rather densely arranged teeth in the upper part, the apex very slenderly caudate-acuminate. Syncarps crowded in erect, peduncled racemes from 3 to 5 in a head, ovoid to ellipsoid, 6 to 8 cm. long, 5 to 6 cm. in diameter, dark-brown when dry, the peduncles up to 20 cm. long, thickened upward, about 1 cm. in diameter, marked with conspicuous, indurated crests, the remnants of fallen sheaths. Drupes numerous, oblong-obovoid, 1-celled, about 2 cm. long, 1 cm. wide, angular, narrowed below, united for $\frac{3}{4}$ of their length; the pericarp indurated, the

hollow portion above the seed 4 to 5 mm. in diameter, the apical free portions convex, abruptly terminated by the somewhat oblique, indurated, shining style which is about 4 mm. long and wide and usually with 2 conspicuous teeth.

British North Borneo, Sandakan, *Ramos 1790*, December, 1920. In rather dry forests at low altitudes. A species belonging in the group with *Pandanus labyrinthicus* Kurz, but with fewer, much smaller syncarps and somewhat smaller drupes.

Pandanus matthewsii sp. nov. § *Astrostigma*.

Frutex, ramis ultimis 1.5 cm. diametro; foliis numerosis, coriaceis, in siccitate pallidis, usque ad 1 m. longis, 1.5 cm. latis, tenuiter acuminatis, margine distanter serratis; syncarpiis solitariis, erectis, ellipsoideis, circiter 8 cm. longis, pedunculatis, drupis numerosissimis, 1-locellatis, confertis, lineari-oblancoelatis, 1.5 ad 1.8 cm. longis; stigma in syncarpio imbricata, plana, 2.5 ad 3 mm. diametro, margine perspicue dentata vel crenato-dentata.

A shrub, the ultimate branches about 1.5 cm. in diameter. Leaves numerous, coriaceous, pale when dry, up to 1 m. long, about 1.5 cm. wide, gradually narrowed upward to the slenderly acuminate apex, the margins rather distantly and sharply toothed, the midrib on the lower surface in the upper part with similar teeth, the teeth slender, ascending, 1 to 1.5 mm. long, the midrib prominent on the lower surface, impressed on the upper surface, the lateral nerves slender, 25 to 30 on each side of the midrib, densely arranged. Staminate inflorescences club-shaped, about 7 cm. long, 1.6 cm. in diameter, the peduncles about 6 cm. long, subtended by several, oblanceolate, sharply acuminate, chartaceous bracts about 9 cm. in length. Syncarps terminal, solitary, erect, ellipsoid, about 8 cm. long, 4.5 to 5 cm. in diameter, their peduncles up to 10 cm. long, about 6 mm. in diameter, brown, shining and longitudinally sulcate when dry, the leaf-like bracts subtending the syncarps, up to 25 cm. in length. Drupes very numerous, crowded, linear-oblancoelate, 1.5 to 1.8 cm. long, about 2 mm. in diameter, 1-celled, attenuate at the base, united throughout except for the 2 mm. long stylar portion; the stigmas plane, subreniform, imbricate, 2.5 to 3 mm. in diameter, their margins distinctly and radiately dentate or crenate-dentate.

British North Borneo, Batu Lima, near Sandakan, *Ramos 1321*, October, 1920. In flat forests along streams at low altitudes. A very characteristic species belonging in the group with *Pandanus stelliger* Ridl. and *P. discostigma* Martelli, for which Martelli has proposed the sectional name *Astrostigma*. It is most closely allied to the latter species, but differs radically in its longer leaves, larger ellipsoid syncarps, and distinctly toothed stigmas. The species is dedicated to Mr. D. M. Matthews, formerly Conservator of Forests in British North Borneo.

Pandanus obovoideus sp. nov. § *Acrostigma*.

Frutex erectus, circiter 2 m. altus; foliis 2 ad 2.5 m. longis, 3.5 ad 4 cm. latis, coriaceis, abrupte acuminatis, margine denticulatis; syncarpiis 4 vel 5, confertis, obovoideis, 8 ad 10 cm. longis, 7 ad 9 cm. latis; drupis numerosissimis, confertis, 1-locellatis, circiter 3 cm. longis, usque ad 5 mm. diametro, apice pyramidatis, scaberulis, brunneis, attenuatis; stylis rectis vel curvatis, rigidis, spiniformis, circiter 1 cm. longis.

An erect shrub about 2 m. high. Leaves 2 to 2.5 m. long, 3.5 to 4 cm. wide, coriaceous, rather pale when dry and somewhat glaucous beneath, margins distantly and minutely toothed, the midrib beneath in the upper half sparingly denticulate, the two lateral nerves on the upper surface sparingly denticulate for the upper 20 to 30 cm., apex slightly acuminate, the acumen rigid, slender, 2 to 3 cm. long. Syncarps usually 5, obovoid, crowded at the apex of the peduncle, 8 to 10 cm. long, 7 to 9 cm. in diameter. Drupes very numerous, crowded, about 3 cm. long, up to 5 mm. in diameter, base attenuate, narrowed into the rigid, very sharp, straight or curved style, the apical part 10 to 12 cm. long, brown when dry, minutely scabrid. Endocarp in the lower one-half, about 1 cm. long, base acute, apex rounded. The hollow space in the mesocarp about 8 mm. long, less than 5 mm. wide.

British North Borneo, Kudat, *Castro 976*, November 20, 1920. In the hills on the Pitas Estate, altitude about 25 m. This species must be closely allied to *Pandanus gibbsianus* Martelli, which, however, according to Miss Gibbs, quoted by Martelli, has leaves 10 to 12 cm. wide, while in the present species they do not exceed 4 cm. in width. The obovoid, rather than oblong or globose syncarps, are rather smaller than in Martelli's species, but there are apparently but slight differences in the drupes.

Pandanus pachyphyllus sp. nov. § *Acrostigma*.

Caulis 3 cm. diametro, 10 ad 15 cm. alta, simplex; foliis numerosis, confertis, crasse coriaceis, circiter 3.2 m. longis, 5 ad 6 cm. latis, tenuiter acuminatis, margine acute dentatis, dentibus superioribus parvis confertis, inferioribus majoribus distantibus patulis; syncarpiis erectis, solitariis, globosis, 10 cm. diametro, drupis numerosissimis, confertis, 1-locellatis, circiter 4 cm. longis, 5 mm. diametro, in dimidio inferiore connatis, in dimidio libero lanceolatis perspicue 5-carinatis acuminatis brunneis 4 ad 5 mm. diametro, rectis vel leviter curvatis, stigmatibus spiniforme.

Stemless or nearly stemless, the leaf-bearing portions of the stems above the surface of the ground 10 to 15 m. high, about 3 cm. in diameter, unbranched. Leaves numerous, crowded, thickly coriaceous, about 3.2 m. long, 5 to 6 cm. wide, narrowed upward to the slenderly acuminate apex, pale when dry, somewhat shining, the midrib impressed on the upper surface, prominent on the lower surface, the lower part furnished with widely scattered, rather stout

teeth, the upper part finely and rather closely toothed on the lower surface, the 2 lateral nerves finely toothed on the upper surface near the apex, the margins with distant, stout, spreading teeth in the lower part, rather finely and closely toothed in the upper part. Syncarps erect, terminal, globose, about 10 cm. in diameter, their peduncles about 8 mm. in diameter, obscurely angled, brown, 10 to 15 cm. long. Drupes very numerous, crowded, 1-celled, including the styler and stigmatic portions 4 cm. long, the lower 2 cm. entirely united, the individual drupes about 5 cm. in diameter, narrowed below, the pericarp rather thin, the seeds about 1 cm. long, the empty portion above the seeds about 4 mm. in length; free portions lanceolate, often somewhat curved, brown, prominently 5-keeled, acuminate, 4 to 5 mm. in diameter, narrowed upward to the spiniform, somewhat curved stigma, the free portions equalling the drupes proper in length.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1541. In forests along small streams at low altitudes. A species strongly characterized by being practically acaulescent and unbranched, as well as by its greatly elongated, thickly coriaceous leaves and its solitary, erect, globose syncarps. The free, lanceolate, acuminate, somewhat curved, prominently 5-carinate portions equal the drupe proper in length, the drupes being wholly united. It apparently belongs in the group with *Pandanus danckelmannianus* K. Schum. of New Guinea.

GRAMINEAE.

Themeda Forskal.

Themeda frondosa (R. Br.) Merr. Interpret. Herb. Amb. (1917) 89.

Anthistiria frondosa R. Br. Prodr. (1810) 200.

Themeda arguens Hack. in. DC. Monong. Phan. 6 (1889) 657, non *Stipa arguens* Linn.

British North Borneo, Sandakan, *Ramos* 1868. In open places at low altitudes. Malay Peninsula and Archipelago to tropical Australia. *Themeda arguens* Hack. is properly the name for the species currently known as *T. ciliata* Hack. of India.

Panicum Linnaeus.

Panicum carinatum Presl, Rel. Haenk. 1 (1830) 309.

British North Borneo, Sandakan, *Yates* 8, *Ramos* 1305. In thickets at low altitudes. Throughout the Philippines, perhaps occurring in some other parts of Malaya; not always clearly distinguishable from *Panicum patens* Linn.

Panicum distachyum Linn. Mant. 1 (1867) 138.

British North Borneo, Sandakan, *Ramos 1765*. Along roads and in open places. Not previously recorded from Borneo. India to China, through Malaya to tropical Australia.

Dinochloa Buse.**Dinochloa pubiramea** Gamble in Philip. Journ. Sci. 5 (1910) Bot. 279; Camus Bamb. (1913) 171.

British North Borneo, near Sandakan, *Agama 1019*, November, 1920. Philippines (Basilan, Mindanao, Negros, Samar, Leyte). This adds another species to the comparatively small list of those known only from Borneo and the Philippines.

CYPERACEAE.

Mapania Aublet.**Mapania sessilis** sp. nov. § *Pandanophyllum*.

Inflorescentiis * spiculiformibus, sessilibus, plerisque infra foliis, castaneis, compressis vel plus minusve triquetris, numerosis, oblongis, 3—3.5 cm. longis; bracteis inferioribus 3—5 mm. longis, 6 vel 8 superioribus imbricatis, oblongo-ovatis, acutis, leviter carinatis, 2.5 cm. longis, 1 cm. latis; acheniis circiter 6, osseis, oblongo-ellipsoideis, 7 ad 8 mm. longis, 3.5 mm. diametro, tenuiter longissime rostrato-acuminatis; foliis numerosis, usque ad 1.3 m. longis, 1.5 cm. latis, deorsum leviter angustatis, basi 1 cm. latis, supra gradatim angustatis, tenuiter longissime caudato-acuminatis, margine serrulatis.

Caudex rather stout, castaneous, somewhat triquetrous, 1.5 cm. in diameter, about 10 cm. high. Leaves numerous, up to 1.3 m. long, about 1.5 cm. wide, gradually narrowed upward to the very slenderly long-acuminate apex, only slightly narrowed below, the basal portions about 1 cm. in width, margins serrulate throughout except near the base, the basal sheathing portions of the leaves castaneous. Inflorescences numerous, sessile or subsessile, of single spikelet-like heads, axillary and along the caudex below the leaves, oblong, castaneous when dry, 3 to 3.5 cm. long, 8 to 10 mm. wide, more or less compressed or somewhat triquetrous, the lower few bracts ovate-oblong to ovate, 3 to 5 mm. long, the succeeding six or eight bracts castaneous, imbricate, shining, somewhat keeled, acute, about 2.5 cm. long, 1 cm. wide, generally oblong-ovate. Glumes white, membranaceous, crowded, scarcely extending beyond the upper bracts. Achenes about 6 in each head, hard, dry, terete or slightly compressed, dark-colored, oblong-ellipsoid, 7 to 8 mm. long, about 3.5 mm. in diameter, long-beaked, the beak and persistent portions of the style about as long as the achenes.

British North Borneo, near Sandakan, *Ramos 1856*, December, 1920. In damp forests along small streams at low altitudes. A remarkably distinct species well characterized by its sessile or subsessile, numerous, oblong, simple, spikelet-like heads and its unusually large, imbricate bracts, the glumes membranaceous and scarcely extending beyond the uppermost bracts. It is the only species of the genus with which I am acquainted, in which the inflorescences are sessile or nearly so, while in this form they are, for the most part, confined to the caudex below the leaves, occurring singly in the axils of decayed leaves from the very base of the caudex.

Mapania affinis sp. nov. § *Halostemma*.

Caudex brevis, crassus, circiter 1.5 cm. diametro; foliis numerosis, perspicue 3-nerviis, usque ad 1.7 m. longis 3 vel 3.5 cm. latis, deorsum vix angustatis, apice subabrupte caudato-acuminatis, acuminis serrulatis tenuibus 3 ad 5 cm. longis, margine et costa subtus in partibus superioribus minute serrulatis; scapis paucis, glabris, sub anthesin circiter 5 cm. longis, sub fructu usque ad 14 cm. longis, partibus inferioribus (ca. 5 cm.) bracteis numerosis imbricatis instructis; capitulis sub anthesin circiter 2 cm. longis, bracteis capitulum aequantibus, sub fructu 5 vel 6 cm. diametro; spiculis circiter 18, ovoideis, 2.5 cm. longis, liberis; acheniis nigris, osseis, oblongo-ovoides, 4 mm. longis, breviter acuminatis.

Caudex short, stout, about 1.5 cm. in diameter. Leaves numerous, prominently 3-nerved, up to 1.7 m. long, 3 to 3.5 cm. wide, scarcely narrowed below, the basal portions folded and usually straw-colored, the apex subabruptly caudate-acuminate, the acumen slender, serrulate, 3 to 5 cm. long, the margins and midrib on the lower surface in the upper part of the leaf minutely serrulate. Scapes few, glabrous, terete, in anthesis about 5 cm. long, in fruit up to 14 cm. long, somewhat thickened upward and 3 to 4 mm. in diameter, the basal 5 cm. supplied with numerous imbricate bracts, the lower ones close, broadly ovate, about 1 cm. long, the upper ones gradually longer, the uppermost oblong-ovate, acute up to 3.5 cm. long. Heads in anthesis about 2 cm. long, oblong-ovoid, the outer bracts as long as the head, about 12 mm. wide, elliptic-ovate, acute, somewhat keeled, the apical portions sparingly appressed-pubescent; heads in fruit 5 to 6 cm. in diameter, composed of numerous (15 to 18) ovoid, large, free spikes up to 2.5 cm. long. Achenes numerous, black, bony, oblong-ovoid, terete or irregularly compressed, about 4 mm. long, shortly acuminate.

British North Borneo, near Sandakan, *Ramos 1596*, November, In damp forests at low altitudes. The same species is represented by *Clemens 9330*, collected at Jolo, Sulu Archipelago, October 15, growing on forested slopes at an altitude of about 800 m. A species belonging in the general alliance with *Mapania palustris* F.-Vill., but differing radically in its mature fruiting heads which are much larger than in the latter species, the individual spikes or partial

inflorescences being also much longer, up to 2.5 cm. in length. The peduncles are also shorter in the present species and are entirely glabrous. In all the Malayan material representing *M. palustris* that I have seen the peduncles are furfuraceous.

Mapania gracilipes sp. nov. § *Pandanophyllum*.

Caudex brevis, circiter 1 cm. crassus; foliis numerosis, circiter 60 cm. longis, 1 cm. latis, deorsum vix angustatis, partibus inferioribus plicatis, apice longe tenuiterque caudato-acuminatis, margine obscure serrulatis; scapis tenuibus,, 12 ad 20 cm. longis, vix 1 mm. diametro, basi squamis paucis oblongis 5 ad 13 mm. longis instructis; capitulis solitariis, circiter 1 cm. longis, spicis propriis inter se vix distinctis, squamis exterioribus oblongo-ovatis, capitula aequantibus; capitulis fructiferis ovoideis, circiter 1.5 cm. diametro; acheniis ovoideis, nigris, osseis, 2.5 mm. longis, breviter apiculatis.

Caudex short,, about 1 cm. in diameter. Leaves numerous, about 60 cm. long, 1 cm. wide, 3-nerved, pale-grayish when dry, the basal portions straw-colored, scarcely narrowed below, the apex gradually narrowed in a long, slender, caudate, denticulate acumen, the margins and the midrib beneath in the upper part obscurely serrulate. Scapes several, lateral, very slender, terete, 12 to 20 cm. long, scarcely 1 mm. in diameter, subtended at the base by few, oblong, 5 to 15 mm. long bracts, each scape bearing a solitary head about 1 cm. long, the head made up of several spikes which are scarcely distinct; external scales oblong-ovate, about 1 cm. long, brownish, equalling the head in length; fruiting heads ovoid, about 1.5 cm. in diameter and 1 cm. in length. Achenes obovoid, lax, bony, 2.5 mm. long, shortly apiculate.

British North Borneo, near Sandakan, *Ramos 1855*, December, 1920. In damp forests at low altitudes. This species is well characterized by its narrow leaves; its very slender elongated scapes; and its small heads, the latter in anthesis about 1 cm. long, the outer bracts as long as the head. In fruit the heads appear as if they were made of three or more spikes, but these spikes are scarcely distinct from each other. The bony achenes are but 2.5 mm. in length, and are very shortly apiculate. It is probably most closely allied to *Mapania debilis* C. B. Clarke.

Mapania heterocephala sp. nov. § *Pandanophyllum*.

Caudex brevis, circiter 1.5 cm. crassus; foliis numerosis, pallidis, 1-nerviis, circiter 85 cm. longis, 2.5 ad 3 cm. latis, deorsum leviter angustatis, partibus inferioribus circiter 2 cm. latis, sursum gradatim angustatis, longe caudato-acuminatis, margine et costa subtus in partibus superioribus serrulatis; scapis paucis, usque ad 9 cm. longis, 1.5 mm. diametro, partibus inferioribus (2 ad 3 cm.) bracteis numerosis imbricatis instructis; inflorescentiis spiciformibus, solitariis vel trinis, cylindraceutis, circiter 3 cm. longis, 8 mm. diametro; bracteis numerosis, imbricatis, circiter 13 mm. longis,

6 mm latis, oblongo--ellipticis, obtusis et brevissime apiculatis, margine scariosis; acheniis anguste oblongo-obovoideis, teretibus, osseis, 5 mm. longis, acutis vel brevissime apiculatis.

Caudex short, stout, about 1.5 cm. in diameter. Leaves numerous, pale-grayish when dry, not very rigid, 1-nerved, about 85 cm. long, 2.5 to 3 cm. wide, slightly narrowed below, the basal part about 2 cm. wide, gradually narrowed upward to the long and slenderly caudate-acuminate apex, the margins and the midrib on the lower surface in the upper part serrulate. Scapes few, lateral, from the caudex below the leaves, up to 9 cm. long, 1.5 mm. in diameter, terete, the lower two to three cm. supplied with numerous imbricate bracts, the bracts ovate to oblong-ovate, 1 to 1.5 cm. long. Inflorescences consisting of a single, solitary, spike-like head or sometimes of three separate, fascicled, similar heads, both types occurring on the same plant, the individual heads terete, about 3 cm. long, 8 mm. in diameter, composed of numerous imbricate bracts, the bracts oblong-elliptic about 13 mm. long, 6 mm. wide, obtuse and very shortly apiculate, their margins scariosus. Achenes bony, narrowly oblong-obovoid, terete, grayish, about 5 mm. long, 2 mm. in diameter, slightly narrowed below, the apex acute or very slightly apiculate.

British North Borneo, Sandakan, *Ramos* 1854, December, 1920. In damp forests along small streams at low altitudes. This species is remarkable in the inflorescences. When the scape bears a single head, the head very strongly resembles that of *Mapania humilis* F.-Vill., but the same plant other scapes occur which bear three fasciculately arranged spikes at their apices. In leaf characters, however, the species is remote from *M. humilis*. It is probably most closely allied to *Mapania longa* C. B. Clarke, but has much shorter scapes and broader leaves.

Cyperus Linnaeus.

Cyperus procerus Rottb. Descr. Nov. Pl. (1773) 29.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1681. In open swampy places. India to southern China, Indo-China and Java.

ARACEAE.

Schismatoglottis Zollinger & Moritz.

Schismatoglottis ferruginea sp. nov.

Caudiculus abbreviatus vel paullo elongatus, usque ad 6 mm. crassus, hypogaeus; petiolis et pedunculis et subtus foliis ad costam nervosque perspicue ferrugineo-ciliatis; foliis membranaceis, ellipticis vel obovato-ellipticis, 12 ad 22 cm. longis, breviter acuminatis, basi rotundatis et perspicue cordatis; nervis primariis utrinque circiter 20; petiolo 5 ad 17 cm. longo; inflorescentiis paucis, pedun-

culatis (pedunculo 3 ad 4 cm. longo); spathis subcylindræis, haud constrictis, 4 ad 7 cm. longis, 6 mm. diametro, deorsum plus minusve ciliatis, sursum glabris. Species *S. barbatae* Engl. affinis.

Petioles, exposed portions of the short caudex, peduncles, and the lower surface of the leaves, especially along the midrib, conspicuously ferrugineously ciliate with elongated spreading hairs. Leaves membranaceous when dry, elliptic to obovate-elliptic, 12 to 22 cm. long, 6 to 10 cm. wide, the apex shortly acuminate, the base rounded and distinctly cordate, the basal lobes more or less overlapping, the sinus 8 to 15 mm. deep, the margins slightly revolute, the upper surface olivaceous, glabrous, somewhat shining, the lower surface paler than the upper; the indumentum largely confined to the midrib, primary and secondary nerves; primary nerves spreading, curved, ultimately ascending, about 20 on each side of the midrib, not very much more prominent than the secondary ones; petioles 5 to 17 cm. long, up to 5 mm. in diameter, sheathing in the lower 3 to 4 cm. Inflorescences few, the peduncles 3 to 4 cm. long. Spathes subcylindric, 4 to 7 cm. long, about 6 mm. in diameter, the basal portion more or less ciliate, the deciduous limb glabrous.

British North Borneo, Batu Lima near Sandakan, *Ramos 1657*, (type), 1753, November, 1920. On boulders in forests at low altitudes. A species strongly characterized by its indumentum, in this character approaching *Schismatoglottis barbata* Engl., but differing radically in its much larger size and in its leaves being conspicuously cordate at the base.

COMMELINACEAE.

Forrestia Lesson.

Forrestia glabrata Hassk. in *Flora* 47 (1864) 630; C. B. Clarke in DC. *Monog. Phan.* 3 (1881) 238.

British North Borneo, near Sandakan, *Wood 932*; Mount Kinabalu, Kiau, *Clemens 9950, 9997*; Sarawak, *Native collector 2120, 2147 Bur. Sci.* Bengal, Sumatra, Java.

LILIACEAE.

Pleomele Salisbury.

Pleomele borneensis sp. nov.

Frutex vel arbor parva, ramosus, glaber, ramulis 1.2 ad 1.5 cm. diametro; foliis numerosis, confertis, lineari-lanceolatis, coriaceis, 45 ad 55 cm. longis, 1.5 ad 2.5 cm. latis, acuminatis, deorsum haud angustatis; paniculis terminalibus, erectis, multifloris, ramis usque ad 40 cm. longis; floribus fasciculatis, 2 cm. longis, tubo 1 cm. longo, lobis linearis, 1 mm. latis, obtusis; fructibus subglobosis, brunneis, leviter inaequilateralibus, apiculatis, 1-, rariter 2-locellatis, 8 ad 10 mm. diametro.

A branched shrub or small tree entirely glabrous, the ultimate branches 12 to 15 mm. in diameter. Leaves numerous, crowded at the tips of the branchlets, linear-lanceolate, coriaceous, 45 to 55 cm., long, 1.5 to 2.5 cm. wide, rather slenderly acuminate, not or but slightly narrowed below, the base sheathing. Panicles terminal, erect, 50 to 60 cm. long, the branches ascending, brownish or olivaceous when dry, up to 40 cm. long, the lower ones subtended by reduced leaves, the upper ones by oblong-lanceolate bracts 1.5 to 2 cm. in length, or the uppermost bracts less than 1 cm. in length. Flowers 2 cm. long, in fascicles of 3 to 5 along the primary branches, their pedicels up to 6 mm. long, the subtending bracts broadly ovate to oblong, obtuse, 2 to 4 mm. long, the bracteoles smaller. Perianth-tube 1 cm. long, the linear lobes 1 mm. wide, obtuse. Anthers 2 mm. long. Ovary oblong, glabrous, 2 mm. long. Fruits dark-brown, fleshy, subglobose, somewhat inequilateral, apiculate by the persistent styles, when dry 8 to 10 mm. in diameter, 1-, rarely 2-celled.

British North Borneo, near Sandakan, *Ramos 1414* (type), *Wood 745*, October and February, 1920, *Castillo 608*, February, 1918. In forests and along small streams at low altitudes. A species belonging in the group with *Pleomele angustifolia* N. E. Br., but with much larger leaves than that species.

Smilax Tournefort.

Smilax gigantea sp. nov. § *Eusmilax*.

Frutex scandens, ramis teretibus, striatis, 8 ad 10 mm. diametro, aculeatis; foliis late ovatis, chartaceis, circiter 35 cm. longis latisque, breviter abrupteque acuminatis, basi latissime rotundatis, perspicue cordatis, 9-nerviis, supra glabris, subtus pubescentibus; infructescentiis circiter 30 cm. longis, umbellulis numerosis, 5 vel 6 cm. diametro, longe pedunculatis, fasciculatis, rhachibus compressis, circiter 20 cm. longis; fructibus globosis, tenuiter pedicellatis, circiter 1 cm. diametro.

A large, coarse, woody vine, the inflorescence-bearing branches terete, brown, striate, 8 to 10 mm. in diameter, armed with scattered, very stout, narrowly pyramidal spines about 2 mm. in length. Leaves broadly ovate, chartaceous to subcoriaceous, about 35 cm. long and wide, the apex very shortly and abruptly acuminate, the base broadly rounded and deeply cordate, the upper surface smooth, glabrous, shining, brownish-olivaceous, the lower surface brownish, rather softly and densely pubescent, the indumentum short, not at all stellate; petioles stout, about 7 cm. long, the sheathing basal portion about 3 cm. in length; nerves about 9, all basal, prominent, the reticulations rather lax. Infructescences about 30 cm. long, the umbels racemosely disposed, from 3 to 6 in the axil of each bract, their peduncles 7 to 10 cm. long, the rachis usually about 20 cm. in length, 4 to 6 mm. wide, strongly flattened, the umbels up to

25 in each infructescence. Fruits globose, shining when dry, about 1 cm. in diameter, 12 to 25 in each umbel, their pedicels slender, 1.5 to 1.8 cm. in length.

British North Borneo, Sebuga near Sandakan, *Ramos 1850*, November, 1920. On damp forested slopes at low altitudes; locally known to the Malays as *Kababu*. A remarkably distinct species on account of its very large, broadly ovate, cordate leaves which are rather densely pubescent on the lower surface; and its ample infructescences which are nearly as long as the leaves. It is allied to *Smilax borneensis* C. DC., but differs radically in its vegetative characters and in the indumentum on the lower surface of the leaves being of simple not stellate hairs.

***Smilax woodii* sp. nov. § *Coilanthus*.**

Species *S. hypoglaucæ* affinis; ramis ramulisque laevibus, inermibus, teretibus, tenuibus; foliis coriaceis vel subcoriaceis, lanceolatis vel elliptico-lanceolatis, 6 ad 9 cm. longis, acuminatis, basi acutis vel subrotundatis, 3- vel 5-nerviis, subtus glaucis; pedunculis tenuibus, quam petiolo longioribus; floribus ♂ umbellatis; sepalis glaucescentibus, 2 mm. longis; pedicellis 3 vel 5 mm. longis.

A scandent, glabrous, unarmed, somewhat woody vine, the branches and branchlets slender, brown, terete. Leaves coriaceous to subcoriaceous, lanceolate to elliptic-lanceolate, 6 to 9 cm. long, 2 to 3.5 cm. wide, acuminate, base acute to subrounded, 3- or 5-nerved, nerves slender, reticulations very obscure, the upper surface brownish, shining, the lower very glaucous; petioles 5 to 10 mm. long, those of the older leaves sometimes tendriferous. Umbels axillary, solitary, each about 15-flowered, the peduncles up to 10 mm. long, the pedicels 3 to 5 mm. long. Male flowers somewhat glaucous, the sepals ovate, 2 mm. long, 1.5 mm. wide; petals oblong, obtuse, 1.5 mm. long, 0.6 mm. wide; stamens 6.

British North Borneo, Sandakan, *Wood 1097* (type), October 28, 1920, on slopes, altitude about 18 m. Sarawak, *Native Collector 835 Bur. Sci.* August, 1912. A species manifestly closely allied to *Smilax hypoglaucæ* Benth., and *S. peguana* A. DC., but distinct from both.

AMARYLLIDACEAE.

Curculigo Gaertner.

***Curculigo borneensis* sp. nov.**

Foliis chartaceis, anguste lanceolatis, 35 ad 50 cm. longis, 5 ad 6 cm. latis, utrinque subaequaliter angustatis, basi cuneatis, apice tenuiter filiformibus, acuminatis, supra glabris, subtus parcissime pubescentibus, nervis utrinque 5 vel 6; petiolo 20 ad 25 cm. longo; inflorescentiis erectis, brevissime pedunculatis, densis, subglobosis vel ovoideis, circiter 4 cm. diametro, bracteis exterioribus ovatis oblongo-ovatis; 2 vel 3 cm. longis, tenuiter acuminatis, junioribus plus minusve ciliatis; petalis anguste oblongis, 10 mm. longis, tubo

dense villosa; fructibus ovoideis, hirsutis, 8 mm. longis, rostratis, rostro 8 ad 10 mm. longo, hirsuto.

A tufted, plant from a rather stout, short rootstock. Leaves chartaceous, narrowly lanceolate, 35 to 50 cm. long, 5 to 6 cm. wide, subequally narrowed at both ends, the base cuneate, the apex very slenderly acuminate, the tip filiform, the upper surface glabrous, the lower surface with very few scattered hairs; lateral nerves distinct, 5 to 6 on each side of the midrib; petioles 20 to 25 cm. long, rather slender, glabrous or with few scattered hairs, their bases inflated, sheathing. Inflorescences erect or suberect, dense, short-peduncled, subglobose or ovoid, about 4 cm. in diameter, the bracts chartaceous, ovate to oblong-ovate, 2 to 3 cm. long, the outer ones about 1 cm. wide, slenderly long-acuminate, when young more or less ciliate, in age glabrous or nearly so; peduncles more or less hirsute, about 2 cm. long. Flowers numerous, crowded, but few developing at one time, yellow, the perianth-tube extended at least 6 mm. above the ovary, villous, the segments narrowly oblong, about 10 mm. long, 2.5 mm. wide, slightly pubescent, ultimately nearly glabrous. Stamens as long as the perianth-segments, the anthers 3.5 to 4 mm. long, linear. Fruits ovoid, somewhat hirsute, about 8 mm. long, black when dry, tipped with a stout, 8 to 10 mm. long, hirsute beak.

British North Borneo, at Batu Lima and Sebuga near Sandakan, *Ramos* 1837 (type), 1712, November and December, 1920. In damp forests at low altitudes. A species belonging in the group with *Cucurliigo latifolia* Dry. and most closely allied to *C. brevipedunculata* Elm. of Palawan and Balabac, differing from the latter especially in its longer perianth-segments and in its smaller fruits which have shorter beaks than in the Philippine species.

***Curculigo glabrescens* (Ridl.) comb. nov.**

Curculigo latifolia Dry. var. *glabrescens* Ridl. Mat. Fl. Malay Penin. (Monocot.) 2 (1907) 67.

British North Borneo, Kudat, *Castro* 982: Sarawak, *Native Collector* 435, 637, 1497, 2432, 2701 *Bur. Sci.* Malay Peninsula, Sumatra.

DIOSCOREACEAE.

***Dioscorea* Linnaeus.**

Dioscorea flabellifolia Prain & Burkill in Elmer, Leaflet Philip. Bot. 5 (1913) 1593, and in Journ. As. Soc. Bengal II 10 (1914) 12.

British North Borneo, Sibyguey, near Sandakan, *Ramos* 1625. In thickets and forests along streams at low altitudes. Previously known only from the Philippines, Laguna and Sorsogon Provinces, Luzon, Mindoro, and Catanduanes Island.

MARANTACEAE.

Phrynium Willdenow.*Phrynium inflatum* sp. nov.

Species *P. capitato* similis, differt bracteis exterioribus multo majoribus, oblongo-ovatis, acuminatis, 7 vel 8 cm. longis, extus fulvo-villosis, vaginis supra capitulis valde inflatis, villosis; floribus longioribus usque ad 2.5 cm. longis, sepalis 1.5 cm. longis, tenuiter acuminatis, fructibus ovoideis-trigonis, leviter villosis, in valvis tribus fassis, haud castaneis.

A species with the habit of *Phrynium capitatum*, exceeding 1 m. in height. Petioles glabrous except above the inflorescences. Leaves oblong, up to 50 cm. long and 10 cm. wide, firmly chartaceous, glabrous on both surfaces, the petioles produced about 14 cm. above the inflorescences, the lower half conspicuously inflated and fulvous-villous, about 3 cm. wide (spread) below. Heads in fruit about 5 cm. in diameter. Lower bract subtending the head, oblong-ovate, acuminate, coriaceous, long fulvous-villous outside, the others ovate acuminate, 3 to 3.5 cm. long, ultimately fibrillose. Pairs of flowers 2, the pedicels stout, about 1 mm. long, the bracteoles narrowly lanceolate, caudate-acuminate, 2.5 cm. long, 3 mm. wide. Ovaries 3-celled, densely fulvous-ciliate, the hairs 2 to 3 mm. long. Calyx lobes narrowly lanceolate, caudate-acuminate, 15 mm. long, 2 to 2.5 mm. wide. Corolla-tube slender, glabrous, 12 to 15 mm. long, the segments up to 9 mm. long. Fruit ovoid-trigonous, about 12 mm. long and wide, more or less fulvous-villous, 3-celled, 3-seeded, opening by 3 longitudinal valves, the pericarp indurated.

British North Borneo, Batu Lima near Sandakan, *Ramos 1488*. On forested slopes at low altitudes. A species strongly characterized by its unusually large first bract, its petioles being inflated above the insertion of the inflorescence, and its strongly trigonous, 3-celled, 3-valved, dehiscent, somewhat villous fruits. The flowers are much longer than in *Phrynium capitatum* Willd., attaining a length of at least 2.5 cm. Only remnants of very old flowers are available.

Phacelophrynium K. Schumann.

Phacelophrynium bracteosum K. Schum. in Engl. Pflanzenreich **11** (1902) 123.

British North Borneo, near Sandakan, *Agama 1033*: Sarawak, Baram District, Lio Matu, *Native Collector 2783 Bur. Sci., Moulton 6706*. Otherwise known only from the Philippines where it is widely distributed in southern Luzon, Samar, Leyte, Biliran, and Mindanao.

MORACEAE.

Artocarpus Forster.

Artocarpus clementis sp. nov.

Arbor magna, subglabra, ramis 5 vel 6 mm. diametro, obscure puberulis; foliis coriaceis, glabris, nitidis, oblongo-ovatis vel ob-

longo-ovatis vel oblongo-lanceolatis, 12 ad 22 cm. longis, 4.5 ad 9 cm. latis, aequilateralibus, basi abrupte angustatis, acutis, apice acuminatis, nervis utrinque circiter 12 perspicuis; fructibus subglobosis, circiter 5.5 cm. diametro, anthocarpiis numerosis, leviter productis, ovoideis, obtusis, circiter 1 mm. longis, uniformiter ferrugineo-furfuraceo-hirsutis; seminibus numerosis, circiter 13 mm. longis, perianthii segmentis leviter hirsutis. Species *A. rigidae* affinis, sed foliis glabris et anthocarpiis brevissime productis.

A large tree glabrous except the very obscurely puberulent branchlets and the furfuraceous-hirsute tips of the anthocarps; branches brown, rugose, terete, 5 to 6 mm. in diameter, the younger branchlets frequently only 3 mm. in diameter. Leaves equilateral, entire, coriaceous, glabrous, shining, oblong-ovate to oblong-lanceolate, 12 to 22 cm. long, 4.5 to 9 cm. wide, the base rather abruptly narrowed, acute, usually gradually narrowed upward to the short, blunt-acuminate apex, brownish or brownish-olivaceous when dry, smooth, shining; lateral nerves about 12 on each side of the midrib, not impressed on the upper surface, very prominent on the lower surface, anastomosing near the margins, the primary reticulations distinct; petioles about 3 cm. long, 2.5 to 3 mm. in diameter, glabrous. Mature or nearly mature fruits subglobose, the base often somewhat cordate, about 5.5 cm. in diameter, their peduncles stout, 3 to 4 cm. in length, the tips of the anthocarps very numerous, ovoid, blunt, about 1 mm. long, the outer surface of the fruit uniformly furfuraceous-hirsute, the indumentum ferruginous. Seeds rather numerous, about 13 mm. long, the accrescent perianth segments more or less hirsute.

British North Borneo, Gurulau Spur, Mount Kinabalu, *Mrs. Clemens 10770*, November 27, 1915. In forests along trails. This species belongs in the group with, and is manifestly allied to *Artocarpus rigida* Blume, from which it is readily distinguished by its entirely glabrous leaves and by the very short tips of its anthocarps.

Artocarpus borneensis sp. nov.

Arbor circiter 10 m. alta, ramis teretibus, circiter 5 mm. diametro, ramulis leviter pubescentibus vel furfuraceis; foliis subcoriaceis, glabris, nitidis, ellipticis vel oblongo-ellipticis, integris, aequilateralibus, 9 ad 14 cm. longis, apice abrupte acuminatis, basi rotundatis vel late acutis, nervis utrinque 10 vel 12, perspicuis; inflorescentiis axillaribus, solitariis, ♂ oblongo-obovoideis, 12 mm. longis, brevissime pedunculatis, bracteolis peltatis, dense imbricatis, cupreis; fructibus subglobosis, 4 cm. diametro, laevibus, dense cupreo-furfuraceo-lepidotis, anthocarpiis haud productis; seminibus paucis, 10 ad 12 mm. longis.

A tree about 10 m. high, mature fruits densely and uniformly furfuraceous-lepidote, the indumentum cupreous. Branches terete, glabrous, about 5 mm. in diameter, the very young branchlets obscurely pubescent or slightly furfuraceous. Leaves subcoriaceous, glabrous, entire, elliptic to oblong-elliptic, 9 to 14 cm. long, 4 to 8

cm. wide, shining, the upper surface olivaceous, the lower surface brownish, apex rather abruptly acuminate, the acumen acute or obtuse, rather stout, about 1 mm. long, base rounded to broadly acute, equilateral or nearly so; lateral nerves 10 to 12 on each side of the midrib, very prominent on the lower surface, spreading, curved, arched-anastomosing close to the margins, the reticulations rather close, distinct on both surfaces; petioles 8 to 10 mm. long. Staminate inflorescences oblong-obovoid to pyriform, axillary, solitary, yellow when fresh, brown when dry, about 12 mm. long, their peduncles stout, ferruginous-puberulent, 1 to 2 mm. in length. Flowers very numerous, crowded, 1 mm. long or less, the anthers only slightly exerted; bracteoles peltate, ciliate, densely imbricate, in the young inflorescences quite concealing the flowers, cupreous. Mature fruit red when fresh, cupreous or castaneous when dry, densely and uniformly furfuraceous-lepidote, smooth, the tips of the anthocarps not evident, subglobose or depressed-globose, about 4 cm. in diameter. Seeds very few, sometimes only 3 or 4 maturing in one fruit, ovoid, 10 to 12 mm. in length, the accrescent perianth segments fleshy, glabrous.

British North Borneo, Batu Lima near Sandakan, *Ramos 1592* (type), 1749, November, 1920, the former with mature or nearly mature fruits, the latter with staminate inflorescences. In damp forests at low altitudes. A species belonging in the group with *Artocarpus gomeziana* Wall. and manifestly closely allied to that species, but at once distinguished by its densely and uniformly furfuraceous-lepidote fruits, the indumentum being cupreous or castaneous.

Artocarpus peltata sp. nov.

Arbor circiter 25 m. alta, partibus junioribus dense ferrugineo-pubescentibus; foliis chartaceis, oblongis vel oblongo-lanceolatis, 20-28 cm. longis, aequilateralibus, integris vel junioribus minute denticulatis, basi rotundatis, distincte peltatis, apice acuminatis, subtus molliter pubescentibus, nervis utrinque circiter 18, perspicuis, stipulis oblongo-ovatis, inaequilateralibus, pubescentibus, 12 mm. longis; inflorescentiis ♀ axillaribus, globosis, pedunculatis; fructibus junioribus 2 cm. diametro, globosis, laevibus, cinereo-puberulis, anthocarpiis haud productis, areolatis, areolis haud 0.5 mm. diametro; seminibus paucis.

A tree up to 25 m. high, the younger parts densely and uniformly ferruginous-pubescent with short hairs. Branches subterete, the ultimate ones 4 to 5 mm. in diameter, very densely pubescent. Leaves chartaceous, oblong to oblong-oblancoelate, 20 to 28 cm. long, 6 to 10 cm. wide, entire, when very young pubescent on both surfaces, in age glabrous on the upper surface except for the pubescent midrib, the lower surface softly pubescent with short hairs, the base rounded, equilateral, narrowly peltate, the petiole inserted 2 to 5 mm. from the leaf margins, the apex distinctly acuminate and usually shortly apiculate, the margins of very young

leaves slightly denticulate; lateral nerves about 18 on each side of the midrib, spreading, somewhat curved, prominent on the lower surface, the reticulations rather distinct; petioles 1 to 1.5 cm. long, densely pubescent; stipules oblong-ovate, inequilateral, pubescent, acuminate, about 12 mm. long. Pistillate inflorescences axillary, globose, 2 cm. or more in diameter (immature), their peduncles densely pubescent, somewhat thickened upward, about 4 cm. long, the surface grayish-puberulent, the position of the numerous anthocarps indicated by small areolae less than 0.5 mm. in diameter, the tips of the anthocarps not projecting. Seeds apparently few in each syncarp.

British North Borneo, Sandakan, *Villamil 168*, March, 1916. On open slopes at an altitude of about 80 m. This species manifestly belongs in the group with *Artocarpus lakoocha* Roxb., but is readily distinguished from it and from other species in the same alliance by its petlate leaves.

URTICACEAE.

Laportea Gaudichaud.

Laportea oblanceolata sp. nov.

Arbor circiter 8 m. alta; foliis oblanceolatis, subcoriaceis, usque ad 35 cm. longis, integris, tenuiter acuminatis, deorsum attenuato-angustatis, subsessilibus vel breviter petiolatis, nervis utrinque circiter 12, perspicuis; infructescentiis longe pedunculatis, folia subaequantibus, floribus flabellatim dispositis, receptaculis accrescentibus.

A tree about 8 m. high, somewhat pubescent, the older parts nearly glabrous except for the short persisting stinging hairs. Ultimate branches rather stout, about 8 mm. in diameter when dry, rugose, the leaf scars conspicuous. Leaves oblanceolate, subcoriaceous, entire, olivaceous, 25 to 35 cm. long, 6 to 12 cm. wide, rather slenderly acuminate, gradually narrowed below to the attenuate-decurrent base, white-punctate on both surfaces, the upper surface glabrous, the lower with short stiff hairs; lateral nerves about 12 on each side of the midrib, prominent; petiole 1 cm. long or less, the lamina often decurrent to the very base; stipules ovate, up to 1.5 cm. long. Young ♀ inflorescences up to 17 cm. long, with numerous short, stiff, white hairs, in fruit long peduncled and equalling the leaves in length. Female flowers sessile in a single row on or near the margins of the flabellate receptacle, the receptacle accrescent, lobed, and in fruit up to 1 cm. in diameter. Achenes glabrous, compressed, ovate, more or less inequilateral, about 4 mm. long. Styles somewhat pubescent, about 3 mm. long.

British North Borneo, Batu Lima, near Sandakan, *Agama 1026* (type), *Ramos 1247*, November, 1920; Baloran River, Labuk Bay, *Wood 676*, March, 1919. On steep slopes and in open places at low altitudes. A species probably as close to *Laportea stimulans*

Miq. as to any other described form, but easily distinguished by its sessile or subsessile leaves.

PROTEACEAE.

Helicia Loureiro.

Helicia excelsa Blume in Ann. Sci. Nat. II 1 (1834) 219.

British North Borneo, Batu Lima, near Sandakan, *Ramos 1653*. In damp forests along small streams at low altitudes. Chittagong, Burma, Malay Peninsula, Singapore, and Sumatra.

LORANTHACEAE.

Viscum Linnaeus.

Viscum angulatum Heyne ex DC. Prodr. 4 (1830) 283.

British North Borneo, Sandakan, *Ramos 1228*: Sarawak, near Kuching, *Native collector 161* (*Bur. Sci.*), March, 1911. India to southern China, through Malaya to tropical Australia.

OLACACEAE.

Fissipetalum genus novum.

Flores regulares, hermaphroditi. Calyx 5-partitus, sepalis imbricatis. Petala 5, infra coalita, valvata, apice lobata, lobis binis, subdivaricatis, in alabastro inflexis. Stamina 5, petalis alterna, filamentis brevibus, glabris, corollae tubo adnatis; antherae erectae, oblongo-ovatae, 2-loculares, connectivo incrassato, minute apiculato. Discus 0 vel obscurus. Ovarium liberum, globosum, 1-loculare; stylus 0; stigma conico-capitatum, sulcatum; ovula 3 vel 4, erecta. Fructus parvus, 1-ocularis, 1-spermus.—Frutex erectus, subglaber, foliis alternis, integris, floribus axillaribus, breviter pedicellatis, solitariis vel depauperato-fasciculatis.

Fissipetalum borneense sp. nov.

Frutex subglaber 2 vel 3 m. altus, ramis ramulisque teretibus, glabris, vel ramulis obscure pubescentibus; foliis oblongis vel oblongo-ellipticis, chartaceis vel subcoriaceis, 12 ad 18 cm. longis, in siccitate brunneo-olivaceis, minutissime verruculosis, nitidis, utrinque subaequaliter angustatis, basi acutis, apice breviter obtuseque acuminatis, nervis utrinque circiter 8, distinctis, reticulis obsoletis vel subobsoletis; floribus circiter 7 mm. longis, sepalis pubescentibus, orbicularibus, petalis extus pubescentibus in dimidio parte, inferiore, lobis glabris; fructibus oblongo-ellipsoideis, glabris, 8 ad 9 mm. longis.

An erect, nearly glabrous shrub 2 to 3 m. high, the branches and branchlets terete, reddish-brown, glabrous or the younger branchlets obscurely pubescent. Leaves oblong to oblong-elliptic, 12 to 18 cm. long, 4.5 to 7 cm. wide, chartaceous to subcoriaceous, entire, subequally narrowed to the acute base and the shortly obtuse-acuminate apex, brownish-olivaceous, somewhat shining and minutely verruculose on both surfaces when dry, the upper surface glabrous, the lower surface glabrous or slightly pubescent; lateral nerves about 8 on each side of the midrib, distinct, ascending at an angle of about 45° , somewhat curved, obscurely and laxly anastomosing, the reticulations obsolete or nearly so; petioles 5 to 10 mm. long, deeply channelled on the upper surface. Flowers white, axillary, solitary or somewhat fascioled, their pedicels 3 to 4 mm. long, slightly pubescent, 2-bracteolate, the bracteoles ovate, pubescent, about 1.2 mm. long. Sepals 5, free, imbricate, somewhat pubescent, orbicular to orbicular-obovate, rounded, about 2.2 mm. in diameter, minutely punctulate. Petals 5, united into a cylindrical tube in the lower 2 mm., externally ferruginous-pubescent in the lower half, or on those parts forming the limb which are exposed in bud, those portions of the petals valvate, oblong, about 3 mm. long, each petal cleft into 2, oblong, glabrous lobes, the lobes truncate-rounded, inflexed in bud, 3 mm. long, 1.2 mm. wide, spreading at an angle of about 45° in anthesis. Stamens 5, alternate with the petals, inserted near the apex of the corolla-tube, their filaments 1 mm. long; anthers ovoid, somewhat acuminate and minutely apiculate, basifixed, 2-celled, about 1.3 mm. long, opening by lateral slits, the connectives stout, broad, narrowed upward. Disk 0 or very obscure. Ovary superior, globose, glabrous, 1-celled with 3 or 4 erect basal ovules; stigma sessile, broadly conical, somewhat sulcate, about 1 mm. in diameter. Fruit (not quite mature) oblong-ellipsoid, glabrous, 8 to 9 mm. long, 1-celled, 1-seeded, the pericarp rather thin, the seed somewhat fleshy, the calyx lobes persistent but not accrescent.

British North Borneo, Batu Lima, near Sandakan, and at Marutai, *Ramos 1454* (type), *Wood 453*, flowering in October and with immature fruits in June. Mr. Wood's specimen is labelled as 'coming from back of the mangrove swamps,' while Ramos notes it occurs in forests and in open places at low altitudes. This proposed new genus presents certain characters intermediate between *Icacinaceae* and *Olacaceae* and might with almost equal propriety be placed in either family. It is at once distinguished from all hitherto described genera in these families by its conspicuously cleft petals, the relatively large lobes being inflexed in bud and spreading at an angle of about 45° in flower. In its stamens being alternate with the petals it differs from most representatives of the *Olacaceae*, while in its erect basal ovules it differs from most or all of the *Icacinaceae*. I have placed it tentatively in the *Olacaceae*.

MENISPERMACEAE.

Jussia genus novum.

Sepala 3, ovata, valvata, concava, circiter $\frac{1}{4}$ connata. Petala 5, subcarnosa, valvata, libera, oblongo-lanceolata. Stamina 5, libera: filamenta brevissima; antherae subpeltatae, ellipticae, 1-locellatae, longitudinaliter dehiscentes. Flores ♀ et fructus ignotis.—Frutex cirrhosus, scandens, glaber vel subglaber. Folia integra, elliptica, basi 5-nervia; petiolus in laminae margine insertus. Paniculae amplissimae, pendulae, e trunco vel ramis vetustis ortae.

***Jussia borneensis* sp. nov.**

Frutex scandens, cirrhosus, inflorescentiis eceptis glaber; foliis ellipticis, chartaceis, integris, subolivaceis, nitidis, 10 ad 15 cm. longis, basi rotundatis, 5-nerviis, apice breviter acuminatis apiculatisque, nervis supra basin utrinque circiter 3; inflorescentiis caulinis, pendulis, paniculatis, usque ad 60 cm. longis; floribus ♂ numerosis, breviter pedicellatis, 6 ad 7 mm. diametro, glabris, sepalis 3, ovatis, 2 mm. longis, usque ad $\frac{1}{4}$ connatis, concavis; petalis 5, oblongo-lanceolatis, leviter acuminatis, 3 ad 3.5 mm. longis, liberis; staminibus 5, liberis, filamentis brevissimis, antheris peltatim affixis, ellipsoideis, 1-locellatis, longitudinaliter dehiscentibus.

A scandent, dioecious, tendril-bearing, woody vine, glabrous except the very slightly and obscurely pubescent inflorescences, the stems terete, about 1 cm. diameter, somewhat wrinkled when dry and with scattered lenticels, the branchlets brownish, about 3 mm. in diameter. Leaves elliptic, chartaceous, entire, subolivaceous, somewhat shining, the upper surface minutely puncticulate, 10 to 15 cm. long, 5 to 10 cm. wide, the base rounded, 5-nerved, the inner pair of nerves extending beyond the middle of the leaf, the apex very shortly and abruptly acuminate, the acumen apiculate by the slightly excurrent midrib; lateral nerves above the basal one about 3 on each side of the midrib, ascending at an angle of about 45°, slender, distinct, the reticulations rather distinct; petioles 2.5 to 3 cm. long; tendrils simple, usually or always attached with the petioles, rather rigid, up to 9 cm. long. Panicles from the stems and branches below the leaves, pendulous, up to 60 cm. in length, the branches rather few, scattered, spreading, up to 17 cm. in length. Flowers racemously arranged on the primary branches, solitary or in pairs, their pedicels about 3 mm. long. Male flowers yellow or yellowish-white, 6 to 7 mm. in diameter. Sepals 3, glabrous, ovate, valvate, 2 mm. long, united for about the lower $\frac{1}{4}$, concave, acute or obscurely apiculate, the buds globose and without reduced sepals or bracteoles. Petals 5, oblong-lanceolate, somewhat acuminate, valvate, glabrous, free, 3 to 3.5 mm. long, 2 mm. wide, somewhat thickened or fleshy. Stamens 5, free, alternate with the petals, the filaments very short, not exceeding 0.2 mm. in length; anthers peltately affixed, ellipsoid, 0.4 mm. long, 1-celled, dehiscing longitudinally by a single valve on the upper surface. Female flowers and fruits not known.

British North Borneo, Batu Lima, near Sandakan, *Ramos 1593* (type), *1578*, November, 1920. In damp forests along streams at low altitudes. This proposed new genus and species distinctly resembles *Haematocarpus*, but does not appear to be closely allied to that genus and may not belong in the tribe *Triclisieae*. In the absence of female flowers and fruits it is difficult to decide its proper place in the family. Among the known genera of the family the present genus differs in its 3 sepals which are somewhat united below, in its 5 petals and 5 stamens,—in most genera the sepals, petals and stamens being in threes or in multiples of three's. This genus is dedicated to Mr. William O. Jupp, for long a resident of Sandakan, in appreciation of his interest in forwarding the field work in botany carried on by the Bureau of Science in co-operation with the Forestry Service of the Government of British North Borneo.

Tinospora Miers.

Tinospora glandulosa sp. nov.

Frutex scandens, glaber; foliis oblongis, subcoriaceis, nitidis, basi rotundatis vel obtusis, usque ad 12 cm. longis, nervis utrinque 7 vel 8, distinctis, subtus in axillis perspicue glandulos; infructescentiis e nodis defoliatis, solitariis, anguste paniculatis, pedunculatis, usque ad 24 cm. longis, ramis primariis patulis inferioribus circiter 3 cm. longis; fructibus junioribus subellipsoideis, 5 mm. longis.

A glabrous vine, the older branches apparently fleshy when fresh, when dry dark reddish-brown and smooth except for the scattered conspicuous lenticels, the younger branches slender, grayish brown, lenticellate. Leaves shining, subcoriaceous, pale and of about the same color on both surfaces when dry, oblong, 9 to 12 cm. long, 3.5 to 5.5 cm. wide, slenderly acute-acuminate, base rounded or obtuse, 3-nerved, the lateral nerves extending from one-fourth to one-third the length of the lamina, those above the basal pair 6 or 7 on each side of the midrib, slender, distinct, the reticulations distinct on both surfaces, the axils of the primary nerves beneath with rather conspicuous glands (domatia); petioles slender, 3 to 4 cm. long. Infructescences lateral, solitary from leafless nodes, slender, narrowly paniculate, peduncled, up to 24 cm. long, the branches spreading, the lower ones 3 m. long, the upper shorter. Immature fruits about 5 mm. long, subellipsoid, narrowed at both ends, inequilateral, 2 or 3 developing from each flower.

British North Borneo, Sandakan, *Wood 939* October, 12, 1920. In bamboo forests at low altitudes. In vegetative characters and in general appearance this somewhat resembles the Philippine *Tinospora reticulata* Miers. It is not, however, very closely allied to that species, being very readily distinguished from this and its congeners by its differently shaped leaves and its more numerous lateral nerves.

Cyclea Arnott.*Cyclea caudata* sp. nov.

Frutex scandens, inflorescentiis leviter pubescentibus exceptis glaber: foliis chartaceis vel subcoriaceis, lanceolatis vel oblongo-lanceolatis, 7 ad 11 cm. longis, basi late rotundatis, interdum angustissime peltatis, apice caudato-acuminatis apiculatisque, nervis paucis, reticulis utrinque distinctis; paniculis ♂ axillaribus, angustis, 10 ad 18 cm. longis; calycibus cupulatis, 1 mm. longis, breviter 4-lobatis; petalis omnibus connatis; antheris 4, capitulis 0.3 mm. diametro.

A slender vine entirely glabrous except the sparingly pubescent inflorescences, the stems terete, rather smooth, 2 to 3 mm. in diameter. Leaves chartaceous to subcoriaceous, lanceolate to oblong-lanceolate, 7 to 11 cm. long, 2 to 4 cm. wide, the base broadly rounded, often truncate, sometimes narrowly peltate, the midrib occasionally inserted 1 to 2 mm. from the margin, narrowed upward to the slenderly caudate-acuminate and apiculate apex, both surfaces olivaceous and somewhat shining when dry; basal nerves usually 2 pairs, the lateral ones above the base 2 or 3 on each side of the midrib, rather prominent, the primary reticulations lax, distinct on both surfaces; petioles 1.5 to 2.5 cm. long. Staminate inflorescences axillary, solitary, narrowly paniculate, 10 to 18 cm. long, sparingly pubescent, the primary branches few, distant, spreading, 1 to 1.5 cm. long. Calyx cup-shaped, about 1 mm. long, somewhat pubescent, shallowly 4-lobed. Corolla glabrous, cup-shaped, truncate, 0.5 mm. in diameter, the petals wholly united. Androphore glabrous, 0.8 mm. long, the anthers 4, forming a head about 0.3 mm. in diameter, transversely dehiscent.

Sarawak, Upper Baram, Selungo, *Major J. C. Moulton 87* (= 2835 *Native Collector Bur. Sci.*), November 26, 1914. A species allied to *Cyclea elegans* King, of the Malay Peninsula, differing in its leaves being caudate-acuminate, the bases being rounded and not at all peltate or at most very narrowly peltate; in its inflorescences exceeding the leaves in length; and in its petals being wholly united into a truncate cup.

MAGNOLIACEAE.

Talauma Jussieu.*Talauma megalophylla* sp. nov.

Arbor, partibus junioribus adpresse sordide brunneo-villosis, ramulis 1.5 cm. diametro; foliis permagnis, oblanceolatis, coriaceis, 45 ad 90 cm. longis, 12 ad 25 cm. latis, coriaceis, nitidis, tenuiter acuminatis, basi cuneatis, supra ad costam villosis, subtus leviter pilosis, nervis utrinque circiter 35, valde perspicuis, reticulis laxis; floribus 10 cm. longis, sepalis 3, crasse coriaceis, oblongis vel oblongo-

ellipticis, 8 ad 9 cm. longis, extus dense villosis; petalis carnosis, glabris, quam sepalis paullo longioribus, in siccitate rugosis; carpellis numerosissimis, villosis; fructibus oblongo-ovoideis vel ellipsoideis, circiter 10 cm. longis, rhachibus 2.5 cm. diametro, carpellis immaturis lanceolatis, 4 cm. longis, lignosis, brunneis, partibus superioribus liberis, 1.5 ad 2 cm. longis.

A tree about 8 m. high, the ultimate branchlets terete, about 1.5 cm. in diameter, pale-brown, densely appressed-villous with soft, dirty-brown hairs. Leaves in general oblanceolate, 45 to 90 cm. long, 12 to 25 cm. wide, coriaceous, pale on both surfaces when dry, shining, the apex rather slenderly acuminate, narrowed below to the cuneate base, the upper surface usually conspicuously villous along the midrib, ultimately glabrous, the lower surface sparingly villous, the hairs pale, appressed, from somewhat enlarged bases; lateral nerves about 35 on each side of the midrib, very prominent on the lower surface, spreading, somewhat curved, arched-anastomosing, reticulations lax; petioles stout, much thickened below, 4 to 5 cm. long, densely villous. Flowers white, slightly fragrant, about 10 cm. long, their peduncles densely villous, about 1 cm. in diameter. Sepals 3, very thickly coriaceous, oblong-ovate to oblong or oblong-elliptic, obtuse, 8 to 9 cm. long, about 4 cm. wide, densely appressed-villous outside, the indumentum somewhat deciduous. Petals apparently very fleshy, dark-brown and rugose when dry, up to 10 cm. long. Carpels very numerous, in flower lanceolate, about 4 cm. long (not mature), woody, dark-brown, the fruit oblong-ovoid or ellipsoid, up to 10 cm. long, the rachis of the mature infructescences up to 2.5 cm. in diameter. Carpels lanceolate, about 4 cm. long (not mature), dark-brown, the indumentum more or less persistent, the free portions 1.5 to 2 cm. in length.

British North Borneo, Batu Lima, near Sandakan, *Ramos 1509*, October, 1920. In damp forests at low altitudes. A species remarkable for its very large leaves, in this character somewhat approaching *Talauma gigantifolia* Miq. of Sumatra which is also recorded from Borneo. The present species, however, differs from Miquel's in very numerous characters, especially in its much longer, differently shaped, smooth leaves, the reticulations being lax and not nearly as prominent as in *T. gigantifolia*.

***Talauma borneensis* sp. nov.**

Arbor circiter 7 m. alta, pedunculis sepalisque adpresse villosis exceptis glabra; ramis tenuibus, laevibus, ramulis 3 mm. diametro; foliis chartaceis, oblongo-ellipticis vel oblongis, 12 ad 28 cm. longis, perspicue acuminatis, basi acutis, utrinque brunneo-olivaceis, nitidisque, nervis utrinque circiter 15, cum reticulis utrinque conspicuis; floribus circiter 5 cm. longis, pedunculo adpresse villosis, sepalis deciduis, extus adpresse villosis, petalis circiter 8, oblongis vel oblongo-obovatis, circiter 5 cm. longis et 2 cm. latis, 3 interioribus valde incrassatis; carpellis circiter 25, lineari-lanceolatis, glabris;

fructibus oblongis, circiter 6 cm. longis, 2.5 cm. diametro, atrobrunneis, glabris, carpellis connatis, verruculosus, circiter 2.5 cm. longis.

A tree about 7 m. high, glabrous except the densely appressed-pubescent apical portions of the peduncles and the appressed-villous sepals. Branches slender, brown, rather smooth, the ultimate ones about 3 mm. in diameter. Leaves chartaceous, oblong-elliptic to oblong, 12 to 28 cm. long, 4.5 to 8 cm. wide, conspicuously acuminate, the base acute, brownish-olivaceous and shining on both surfaces; lateral nerves about 15 on each side of the midrib, curved, distinct on both surfaces as are the rather close reticulations; petioles 1 to 2 cm. long, thickened in the lower one-half. Peduncles in flower about 5 cm. long, densely appressed-pubescent with pale hairs, the indumentum deciduous on the older peduncles. Flowers white, about 5 cm. long, the sepals apparently 2, deciduous, rather densely appressed-villous with pale hairs on the back. Petals at least 8, oblong to oblong-obovate, glabrous, about 5 cm. long and 2 cm. wide, apparently somewhat fleshy, brown when dry, rounded, the inner three much thicker than the outer ones. Anthers linear-lanceolate, 12 to 13 mm. long, acuminate. Carpels about 25, linear-lanceolate, glabrous except near their apices where they are sparingly ciliate, the free portions in flower 8 to 10 mm. long. Fruit oblong, about 6 cm. long, 2.5 cm. wide, dark-brown when dry, the individual carpels cohering except at their very apices, verrucose, glabrous, the tips spreading, stout, 2 to 3 mm. long.

British North Borneo, Sibuguey, near Sandakan, *Ramos 1533*, November, 1920. In damp forests at low altitudes. A species belonging in the group with *Talauma mutabilis* Blumè, and very closely approximating in vegetative characters to *T. kunstleri* King, differing from both species in its much larger flowers and fruits.

ANONACEAE.

Artabotrys R. Brown.

Artabotrys clementis sp. nov.

Frutex scandens, glaber (floribus ignotis), ramis ramulisque teretibus in siccitate atropurpureo-brunneis, leviter rugosis; foliis chartaceis, nitidis, oblongis vel anguste oblongo-obovatis, 10-20 cm. longis, perspicue acuminatis, basi obtusis, nervis utrinque circiter 12, subtus perspicuis, reticulis utrinque subdensis, perspicuis; fructibus longe pedicellatis, ellipsoideis vel oblongo-ellipsoideis, in siccitate atropurpureis, usque ad 4 cm. longis et 2.3 cm. diametro, glabris, seminibus usque ad 8, 2-seriatis.

A scandent vine entirely glabrous (flowers unknown), the branches and branchlets slender, terete, dark-brown, somewhat wrinkled when dry, the ultimate branchlets about 1.5 mm. in diameter. Leaves chartaceous, oblong to narrowly oblong-obovate, 10 to 20 cm. long, 4 to 7 cm. wide, the apex rather slenderly and

sharply acuminate, base obtuse, the upper surface pale or brownish when dry, the lower pale-brownish, both surfaces shining; lateral nerves about 12 on each side of the midrib, distinct on the lower surface, somewhat curved, obscurely anastomosing, the reticulations rather close and distinct on both surfaces; petioles 3 to 7 mm. long. Peduncles of the infructescences 1 to 2 cm. long, rather stout, the torus woody, up to 1.5 cm. in diameter: fruits 5 to 20, ellipsoid to oblong-ellipsoid, dark-brown when dry, glabrous, rounded at both ends, up to 4 cm. long, 2.5 cm. in diameter; seeds 2-seriate, up to 8 in each fruit, or in those cases where the fruit is imperfectly developed and globose, only 1.

British North Borneo, Batu Lima and Sibuga, near Sandakan, *Ramcs 1667* (type), 1480, October and November, 1920; Jesselton, *Mrs. Clemens 9670*, December, 1915. In thickets along trails and in forests at low altitudes. A species well characterized within the genus by being, so far as known, entirely glabrous: it is probable that the flowers may be more or less pubescent. It is manifestly allied to *Uvaria lurida* Hook. f. & Th., but the seeds are 2-seriate, not 1-seriate as in the latter species.

Artabotrys borneensis sp. nov.

Frutex scandens, inflorescentiis exceptis glaber vel subglaber; foliis chartaceis, ellipticis vel elliptico-oblongis, pallide olivaceis, nitidis, 10-13 cm. longis; utrinque subaequaliter angustatis, basi acutis, apice perspicue obtuseque acuminatis; nervis utrinque circiter 8, plerumque patulis, perspicuis; inflorescentiis oppositifoliis, plerumque 1-floris; pedunculis curvatis, compressis, 1-1.5 cm. longis; floribus 4 cm. longis; sepalis ovatis, acuminatis, leviter pubescentibus vel vetustioribus glabris, exterioribus oblongo-ellipticis, 1.5 cm. latis, obtusis; carpellis circiter 12, glabris, stylis crasse clavatis, obtusis; disco dense ferrugineo-hirsuto.

A scandent shrub glabrous or nearly so except for the inflorescences. Branches and branchlets slender, terete, black when dry, the ultimate branchlets about 1 mm. in diameter, more or less ferruginous-pubescent at their apices. Leaves chartaceous, elliptic to elliptic-oblong, pale-olivaceous, shining, 10 to 13 cm. long, 4 to 6 cm. wide, subequally narrowed to the acute base and to the conspicuously blunt-acuminate apex, the acumen usually about 1 cm. long; lateral nerves about 8 on each side of the midrib, mostly spreading, arched anastomosing, rather prominent, the reticulations lax and distinct on both surfaces; 4 to 5 mm. long. Inflorescences on the ultimate branchlets, leaf-opposed, usually only 1-flowered, the peduncles stout, strongly curved, compressed, 1 to 1.5 cm. long, sparingly appressed-ferruginous-pubescent. Flowers 4 to 4.5 cm. long, their pedicels stout, thickened upward, glabrous or nearly so, about 8 mm. long. Sepals coriaceous, ovate, prominently acuminate, black when dry, glabrous or very slightly pubescent, about 6 mm. long, 5 mm. wide. Petals thickly coriaceous, all broad, flat, sparingly pubescent on both surfaces or ultimately glabrous or

nearly so; outer three petals oblong-ovate to ovate, acute or obtuse, 4 to 4.5 cm. long, 2 to 2.3 cm. wide, the concave basal part rather conspicuously appressed-ferruginous-pubescent outside, 5 to 7 mm. long and wide; inner petals oblong-elliptic, 3.5 to 4 cm. wide, somewhat narrowed below to the concave basal part which is 6 to 7 mm. long, 3 mm wide. Anthers numerous, 2.5 mm. long, the connectives truncate-rounded. Carpels about 12, glabrous, narrowly oblong, narrowed upward, 2 mm. long; style thicker than the ovary, equalling it in length, thickly club-shaped, the apex obtuse. Disk densely ferruginous-hirsute.

British North Borneo, Batu Lima, *Bur. Sci. 1366 Ramos*, October, 1920. In damp forests at low altitudes. The striking characters of this species are its large, broad petals and its usually 1-flowered inflorescences.

Artabotrys trichopetalus sp. nov.

Frutex scandens, ramis rugosis, glabris, ramulis leviter pubescentibus; foliis coriaceis, oblongo-ellipticis, 10-17 cm. longis, apice obtuse acuminatis, basi plerumque rotundatis, supra glabris, castaneis, subtus brunneis, leviter longe ciliatis, nervis utrinque 9 vel 10, subtus perspicuis; inflorescentiis lateralibus, paucifloris, pedunculis crassis, teretibus, 1.5 cm. longis, subglabris; floribus circiter 3 cm. longis, pedunculis 2-bracteatis, bracteis elliptico-ovatis, 1 cm. longis, extus dense ciliatis, intus glabris; sepalis petalisque dense ciliatis pubescentibusque; sepalis 12 mm. longis, acuminatis; petalis exterioribus planis, 10 mm. latis, oblongo-ellipticis, interioribus lanceolatis, 5 vel 6 mm. latis, crassissimis; antheris 3 mm. longis, connectivo crassissimo, obtuso, 1-1.5 mm. longo; carpellis circiter 25, glabris.

A woody vine, the branches grayish-brown, glabrous, 3 to 4 mm. in diameter, rugose when dry. Leaves coriaceous oblong-elliptic, 10 to 17 cm. long, 4 to 7 cm. wide, the upper surface castaneous when dry, glabrous, somewhat shining, the lower surface brown, more or less ciliate with long, rather pale, subappressed hairs, the individual hairs often 2 to 3 mm. in length and more numerous on the midrib and nerves, otherwise widely scattered; apex blunt-acuminate, base usually rounded sometimes acute; lateral nerves 9 or 10 on each side of the midrib, somewhat ascending arched-anastomosing, prominent on the lower surface, the reticulations lax, rather distinct; petioles 5 to 9 mm. long, when young more or less pubescent, ultimately glabrous. Inflorescences lateral, from the branches among or below the leaves, few-flowered, the peduncles very stout, strongly curved and terete, up to 1.5 cm. long, glabrous or nearly so, rugose. Flowers greenish, about 3 cm. long, their pedicels up to 1.5 cm. long, very densely ciliate with long ferruginous hairs, each supplied with 2 conspicuous, elliptic-ovate, coriaceous, somewhat acuminate bracts about 1 cm. long which are densely ciliate and pubescent outside, glabrous inside. Sepals coriaceous, ovate-lanceolate, acuminate, about 12 mm. 6 to 17 mm. wide,

densely appressed-ciliate and pubescent outside, inside appressed-pubescent except in the lower part which is glabrous. Petals thickly coriaceous, all densely pubescent on both surfaces and supplied with numerous, subappressed, elongated, ciliate hairs, the indumentum pale-brownish or grayish; the outer three petals about 3 cm. long, 12 mm. wide, the basal concave part broadly ovate, 6 to 8 mm. wide and long, the flattened portions oblong-elliptic, acute, somewhat narrowed below; inner three petals lanceolate, up to 2.5 cm. long, 5 to 6 mm. wide, very much thickened, the arched basal part 6 to 7 mm. long, 5 mm. wide, glabrous inside, the free portions narrowly lanceolate, acuminate. Anthers numerous, 3 mm. long, the connectives much thickened, 1 to 1.5 mm. long, obtuse. Carpels about 25, oblong, curved, glabrous, narrowed upward, 1.8 to 2 mm. long; style as long as the carpels, club-shaped.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1465, October, 1920. In damp forests at low altitudes. A species remarkable for its indumentum and especially for its very densely pubescent and ciliate sepals and petals, as well as for its conspicuous, elliptic, 1 cm. long, ciliate and pubescent bracts. The indumentum on the lower surface of the leaves is widely scattered, consisting chiefly of slender, elongated, subappressed hairs, attaining 2 to 3 mm. in length

Artabotrys trigyna sp. nov

Frutex scandens, floribus exceptis glaber vel subglaber; ramis ramulisque tenuibus, in siccitate nigris vel atro-brunneis, ramulis junioribus parcissime adpresse pubescentibus; foliis oblongis vel oblongo-ellipticis, 10-15 cm. longis 2.5-5 cm. latis chartaceis vel subcoriaceis, glabris, utrinque subaequaliter angustatis, basi acutis, apice perspicue acuminatis, nitidis, brunneo-olivaceis, nervis utrinque 12-15, tenuibus, distinctis; inflorescentiis oppositifoliis, breviter pedunculatis, parce pubescentibus, teretibus vel obscure compressis; floribus 2.5-3 cm. longis, sepalis parcissime pubescentibus, ovatis, acuminatis, 6 mm. longis petalis basi concavis 4 mm. diametro, dense subferrugineo-pubescentibus, supra linearibus, circiter 1 mm. latis, parce pubescentibus; carpellis 3, ovoideis, glabris, stigmatibus circiter 1 mm. diametro.

A scandent shrub, nearly glabrous except the flowers. Branches and branchlets slender, terete, dark-brown or nearly black when dry, the ultimate branchlets very sparingly appressed-pubescent. Leaves oblong to oblong-elliptic, chartaceous or subcoriaceous, glabrous, shining, brownish-olivaceous when dry, 10 to 15 cm. long, 2.5 to 5 cm. wide, subequally narrowed to the acute base and the conspicuously acuminate apex; lateral nerves 12 to 15 on each side of the midrib, spreading, slender, distinct on both surfaces, arched-anastomosing, the reticulations lax; petioles 3 to 4 mm. long. Inflorescences leaf-opposed sparingly appressed-pubescent, the peduncles about 1 cm. long, at first nearly straight, ultimately curved, terete or slightly compressed, each bearing

about 5 flowers. Flowers yellow, about 2.5 to 3 cm. long, the subtending bracteoles oblong to oblong-ovate, deciduous, about 2.5 mm. long, the pedicels nearly glabrous, thickened upward, about 1 cm. long. Sepals coriaceous, ovate, narrowed upward to the conspicuously acuminate apex, very sparingly appressed-pubescent of nearly glabrous, about 6 mm. long, 5 mm. wide. Petals subequal, the concave bases densely appressed-pubescent on both surfaces, about 4 mm. long and wide, then abruptly contracted and linear, the linear part often curved, sparingly appressed-pubescent, thickened, obtuse, about 1 mm. wide, 2.5 cm. long. Anthers numerous, 1.5 to 1.8 mm. long, narrowed below, the connectives thickened, truncate and minutely pubescent at the apex. Carpels 3, ovoid, glabrous; styles about 1 mm. long, the stigmas expanded, disciform, about 1 mm. in diameter; disk densely ferruginous-pubescent. Fruits ellipsoid, dark-brown smooth, glabrous, sessile, about 1 cm. long; seeds 2, collateral.

British North Borneo, Batu Lima and Sibuga, near Sandakan, *Ramos 1178* (type), 1875, October and December, 1920. In damp forests at low altitudes. A species belonging in the group with *Artabotrys suaveolens* Blume, and apparently most closely allied to *A. maingayi* Hook. f. and Th. and *A. gracilis* King, differing from all of these in numerous details in floral structure.

Fissistigma Griffith.

Fissistigma clementis sp. nov.

Frutex scandens, partibus junioribus foliisque subtus breviter adpresse ferrugineo-pubescentibus; ramis glabris; foliis oblongo-ellipticis, chartaceis, 4-8 cm. longis, acutis vel acuminatis, basi rotundatis vel obtusis, supra olivaceis, glabris, nitidis, subtus, brunneis et minute adpresseque ferrugineo-pubescentibus; nervis lateralibus utrinque 8-10, tenuibus; floribus axillaribus, solitariis, circiter 2.3 cm. longis; calyce triangulari, 4 vel 5 mm. diametro; petalis crassissimis, exterioribus oblongo-lanceolatis, obtuse acuminatis, 8-10 mm. latis, extus minute adpresseque pubescentibus, interioribus ovatis, 4 mm. longis, 3.5 mm. latis, acutis; carpellis plusminusve 10, glabris.

A scandent shrub, the younger parts, lower surface of the leaves, and flowers more or less ferruginous-pubescent. Branches and branchlets terete, slender, dark-brown or nearly black when dry, the former glabrous the latter more or less appressed-pubescent with shining ferruginous hairs, the very tips of the branchlets densely ferruginous- or cupreous-pubescent. Leaves oblong-elliptic, chartaceous, 4 to 8 cm. long, 2 to 3 cm. wide, the apex acute or acuminate, the base rounded or broadly acute, the upper surface olivaceous, glabrous, the lower surface brownish and minutely appressed-ferruginous-pubescent, the hairs more or less shining; lateral nerves 8 to 10 on each side of the midrib, slender, obscurely anastomosing, not prominent; petioles somewhat

pubescent or ultimately glabrous, 4 to 5 mm. long. Flowers yellow, axillary, solitary, about 2.3 cm. long, their pedicels up to 5 mm. long, somewhat pubescent and with 1 or 2 small bracteoles at or near the base. Calyx triangular, 4 to 5 mm. in diameter, somewhat ferruginous-pubescent, the angles acute. Petals much thickened, the outer 3 oblong-lanceolate, blunt-acuminate, 2 to 2.3 cm. long, 7 to 8 mm. wide, minutely appressed-pubescent with shining, ferruginous, short hairs, keeled inside, hollowed at the base; inner petals ovate, about 4 mm. long, 3.5 mm. wide, acute, somewhat pubescent. Anthers numerous, 1 to 1.2 mm. long, their connectives oblong-truncate. Carpels about 10, inequilateral, oblong, glabrous, 1 to 1.2 mm. long; styles about 0.7 mm. long. Very young fruits globose, glabrous, about 4 mm. in diameter, their pedicels 5 mm. in length.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1474 (type), October, 1920, in damp forests at low altitudes; Khota Balud to Kibayo, trail to Mount Kinabalu, *Mrs. Clemens* 9766, October, 1915. A species in vegetative characters closely approximating to *Fissistigma elegans* (Wall.) Merr., but differing in numerous floral characters.

Oxymitra Blume.

Oxymitra grandifolia sp. nov.

Frutex scandens, ramulis et petiolis et subtus foliis ad costam nervosque perspicue ferrugineo-pubescentibus; foliis magnis, chartaceis, oblongo-ellipticis vel oblongo-obovatis, 25-50 cm. longis, apice plerumque late rotundatis, basi rotundatis, distincte cordatis, nervis utrinque 18-25, perspicuis, supra nitidis, costa excepta glabris, utrinque brunneis; infructescentiis extra-axillaribus, 4 vel 5 cm. diametro, fructibus numerosis, ellipsoideis, apiculatis, ferrugineo-pubescentibus, 10-12 mm. longis.

A scandent vine, the branchlets, infructescences and leaves on the lower surface conspicuously ferruginous-pubescent. Branches brown, about 5 mm. in diameter, wrinkled when dry, ferruginous-pubescent or glabrous, the branchlets very densely pubescent. Leaves chartaceous, oblong-obovate to oblong-elliptic, 25 to 50 cm. long, 11 to 15 cm. wide, the apex usually broadly rounded or sometimes very broadly and obscurely blunt-acuminate, the base rounded and usually shallowly cordate, the upper surface olivaceous, smooth, shining, glabrous or the midrib somewhat pubescent, the lower surface brown, rarely slightly glaucous, sparingly ferruginous-pubescent on the midrib, nerves, and reticulations; lateral nerves 18 to 25 on each side of the midrib, somewhat ascending, slightly curved, anastomosing, very prominent on the lower surface, the primary reticulations subparallel, distinct; petioles stout, pubescent, 6 to 18 mm. long. Infructescences extra-axillary, their peduncles stout, ferruginous-pubescent, 1 to 1.5 cm. long, the torus slightly thicker than the peduncle.

ferruginous-pubescent. Fruits numerous, ellipsoid, yellowish-white when fresh, brown when dry, 10 to 12 mm. long, more or less ferruginous-pubescent, apiculate, their pedicels pubescent, 1 to 1.5 cm. in length.

British North Borneo, Batu Lima and Sibuga, near Sandakan, *Ramos* 1910 (type), 1911, 1170, October and December, 1920. In damp forests at low altitudes. A species belonging in the group with *Oxymitra calycina* King and apparently most closely allied to *O. philippinensis* Merr., from which it is distinguished by its larger, more numerous nerved leaves, which are brown, not glaucous beneath, and in its much more conspicuous and longer indumentum.

***Oxymitra acuminata* sp. nov.**

Frutex scandens, ramulis petiolisque dense adpresse ferrugineo-pubescentibus; ramis glabris, nigris, ramulis 1.5 mm. diametro; foliis chartaceis, oblongo-ellipticis vel anguste oblongo-ovatis, 13-18 cm. longis, perspicue crasseque acuminatis, basi rotundatis, plerumque leviter cordatis, utrinque brunneis, nitidis, supra glabris vel ad costam nervosque parce pubescentibus, subtus haud glaucescentibus, vetustioribus glabris; nervis utrinque 10-15, subtus valde perspicuis, reticulis utrinque distinctis; infructescentiis in ramulis ultimis axillaribus extra-axillaribusque, circiter 4 cm. diametro, fructibus numerosis, ellipsoideis, apiculatis, 1 cm. longis, leviter pubescentibus, glabrescentibus.

A woody vine, the branchlets and petioles densely appressed-ferruginous-pubescent, the branches slender, terete, glabrous, nearly black when dry, 2 to 3 mm. in diameter, the ultimate branchlets 1.5 mm. in diameter. Leaves chartaceous, oblong-elliptic to narrowly oblong-ovate, 13 to 18 cm. long, 4.5 to 6 cm. wide, the apex conspicuously and rather stoutly acuminate, the acumen up 2 cm. long, blunt, the base rounded and usually slightly cordate, the upper surface brown or brownish-olivaceous, strongly shining, glabrous or nearly so, or the midrib and lateral nerves sparingly pubescent, the lower surface paler than the upper, brown, not at all glaucous, sparingly pubescent on the midrib and nerves, ultimately entirely glabrous; lateral nerves 10 to 15 on each side of the midrib, somewhat curved-anastomosing, very prominent on the lower surface, the primary reticulations subparallel and distinct on both surfaces; petioles 5 to 8 mm. long. Infructescences axillary and extra-axillary on the ultimate branchlets, their peduncles 1.5 to 2 cm. long, ferruginous-pubescent. Fruits numerous ellipsoid, about 1 cm. long, apiculate, sparingly pubescent or nearly glabrous, their pedicels somewhat thickened upward, pubescent, about 1 cm. long.

British North Borneo, Sibuga and Batu Lima, *Ramos* 1567 (type), 1171, October and November, 1920. In damp forests along small streams at low altitudes.

Goniothalamus Blume.**Goniothalamus stenophyllus** sp. nov.

Arbor, floribus exceptis glabra; ramis ramulisque tenuibus; foliis lineari-lanceolatis, chartaceis, olivaceis, nitidis, 20-30 cm. longis, 1.5-2.5 cm. latis, basi acutis vel subrotundatis, apice acuminatis, nervis utrinque circiter 23, supra impressis, subtus perspicuis, arcuato-anastomosantibus, reticulis laxis, obscuris; floribus caulinis vel in ramis vetustioribus solitariis vel fasciculatis, circiter 2.3 cm. longis, petalis exterioribus parvissime pubescentibus, lanceolatis, 7 vel 8 mm. latis, interioribus crassissime coriaceis, ovato-lanceolatis, utrinque pubescentibus, 10-12 mm. longis; antheris 2.5 mm. longis, connectivo apiculato; carpellis numerosis, oblongis, cupreo-hirsutis, 1-ovulatis.

A shrub or small tree entirely glabrous except the flowers. Branches and branchlets slender, pale when dry, terete or the branchlets somewhat enlarged and slightly compressed at the nodes. Leaves chartaceous, olivaceous and shining on both surfaces, linear-lanceolate 20 to 30 cm. long, 1.5 to 2.5 cm. wide, narrowed upward to the acuminate apex, the base rather abruptly acute, sometimes rounded; lateral nerves impressed on the upper surface, very prominent on the lower surface, the latter about 23 on each side of the midrib, straight or somewhat curved, anastomosing directly with the somewhat arched, equally distinct, submarginal nerves, the reticulations lax, obscure. Flowers cauline or on the larger branches below the leaves, solitary or fascicled, about 2.3 cm. long, their pedicels pubescent, 3 to 4 mm. in length. Sepals ovate, prominently acuminate, slightly pubescent, obscurely nerved, about 6 mm. long, 4.5 mm. wide. Outer petals lanceolate, about 2.3 cm. long, 7 to 8 mm. wide, acuminate, slightly pubescent; inner petals much thickened, ovate-lanceolate, about 12 mm. long, blunt-acuminate, pubescent, the upper portion of the cone triangular. Carpels many, oblong, 1-ovulate, 1.5 mm. long, appressed-pubescent; styles elongated, pubescent, 3 to 3.5 mm. long; stigmas somewhat expanded, not lobed nor toothed. Anthers oblong, 2.5 mm. long, their connectives apiculate.

Sarawak, Siol, *Native collector 2423*, February to June, 1914, the flowers indicated as yellow. A very strongly marked species readily recognizable by its chartaceous, linear-lanceolate, prominently nerved leaves, the midrib, lateral and marginal nerves being impressed on the upper surface and very prominent on the lower surface.

Goniothalamus nitidus sp. nov.

Arbor circiter 7 m. alta, ramulis junioribus plus minusve cupreo- vel castaneo-pubescentibus, ramis glabris; foliis olivaceis, utrinque nitidis, supra glabris, subtus glabris vel parce pubescentibus, chartaceis, oblongis vel oblongo-ellipticis, 22-30 cm. longis, apice abrupte obtuseque acuminatis, basi acutis, nervis

utrinque 17-20, subtus perspicuis, arcuato-anastomosantibus; floribus fasciculatis, caulinis vel in ramis vetustioribus, pedicellatis, plusminusve 6.5 cm. longis, leviter pubescentibus; sepalis orbiculari-ovatis, 1 cm. diametro, reticulatis; petalis exterioribus lanceolatis, longe acuminatis, 1.5-2 cm. latis, interioribus calyptratis, 1 cm. longis; carpellis numerosis, 1- vel 2-ovulatis, hirsutis, stylis 3 mm. longis, glabris, stigmatibus 2-lobatis, lobis subflabellatis; fructibus oblongo-obovoideis, rugosis, glabris, circiter 2 cm. longis; seminibus 1, rariter 2.

A tree about 7 m. high, the very young branchlets more or less cupreous- or castaneous-pubescent, the flowers also somewhat pubescent. Branches dark-colored when dry, glabrous. Leaves olivaceous, shining on both surfaces, oblong to oblong-elliptic, 22 to 30 cm. long, 6 to 10 cm. wide, chartaceous, the apex abruptly and obtusely acuminate, the base acute, the upper surface glabrous, the lower surface sparingly pubescent, ultimately glabrous or nearly so; lateral nerves 17 to 20 on each side of the midrib, prominent on the lower surface, nearly straight, anastomosing directly with more or less arched marginal nerves 3 to 7 mm. from the edge of the leaf; the marginal nerves as prominent as the lateral ones, the reticulations subparallel, slender, rather lax; petioles 1 to 1.5 cm. long, slightly pubescent, ultimately glabrous. Flowers dark-red or reddish-brown, fascicled on the branches below the leaves and on the trunk, about 6.5 cm. long, their pedicels dark-brown when dry, sparingly ferruginous pubescent, 1.5 to 2 cm. long, each subtended by several ovate or oblong-ovate densely pubescent bracts 2 to 2.5 mm. in length. Sepals orbicular-ovate, nearly free, about 1 cm. in diameter, rounded or very shortly and obtusely acuminate, somewhat pubescent and distinctly nerved. Outer three petals lanceolate, 6 to 6.5 cm. long, 1.5 to 2 cm. wide, somewhat narrowed below, greatly narrowed upward to the rather slenderly but obtusely acuminate apex, sparingly appressed-pubescent on both surfaces, brown when dry, with a distinct midrib and several slender lateral nerves; inner three petals connivent, about 2.3 cm. long, 1 cm. wide, pubescent externally, glabrous inside, the lower surface of the cone somewhat inflated, then contracted, the upper part sharply triangular. Stamens very numerous, oblong, 3.5 mm. long, the connectives apiculate. Carpels many, oblong, inequilateral, 1.5 mm. long, pubescent, 1- or 2-ovulate; styles about 3 mm. long, glabrous, thickened upward, the stigma somewhat 2-lobed, the lobes more or less flabellate. Fruits oblong-ovoid, brown when dry, rugose, glabrous, about 2 cm. long, the apex rounded, base acute, the pedicels sparingly pubescent, their apices somewhat triangular. Seeds 1 or 2, obovoid, compressed, about 1.5 cm. long.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1668 (type), 1724, 1276. On steep forested ridges and along small streams in forests at low altitudes. A species apparently allied to *Goniothalamus fasciculatus* Boerl., from which it differs in its

chartaceous, abruptly and shortly obtuse-acuminate leaves, orbicular-ovate and distinctly nerved sepals, and in its larger flowers, the external petals not caudate-acuminate, the internal petals much larger and up to 2.3 cm in length.

Goniothalamus dolichocarpus sp. nov.

Frutex 1 ad 3 m. altus, floribus exceptis glaber; foliis chartaceis vel subcoriaceis, oblongo-lanceolatis vel oblongo-oblancheolatis vel oblongo-ellipticis, in siccitate utrinque griseis et minutissime verrucosis, 25-40 cm. longis, 7-12 cm. latis, obtuse acuminatis, basi acutis vel subrotundatis, nervis utrinque 15-30, supra leviter impressis, subtus perspicuis, arcuato-anastomosantibus; floribus caulinis, plerumque solitariis, 3 cm. longis, petalis coriaceis, cinereo-pubescentibus, exterioribus oblongo-lanceolatis, 8-10 mm. latis, interioribus conniventibus, 2.2 cm. longis; antheris 3.5-4 mm. longis, connectivo rostrato; carpellis circiter 10, oblongis, 5- vel 9-ovulatis, stigma truncato; fructibus cylindraceis, 6-11 cm. longis, 1.5-2 cm. diametro, glabris, seminibus 4-9.

A shrub 1 to 3 m. high, the trunk 1 to 2.5 cm. in diameter, glabrous except the flowers, branches grayish or brownish, rather smooth, terete, the ultimate ones 2 to 3 mm. in diameter. Leaves chartaceous to subcoriaceous, oblong-lanceolate to oblong-oblancheolate or oblong-elliptic, grayish and shining on both surfaces when dry and usually minutely verruculose, 25 to 40 cm. long, 7 to 12 cm. wide, obtusely acuminate, the base acute to somewhat rounded; lateral nerves 15 to 30 on each side of the midrib, slightly impressed on the upper surface, conspicuous on the lower surface, arched-anastomosing, forming a more or less looped marginal nerve, the reticulations lax, not prominent; petioles 1.2 to 2 cm. long. Flowers chiefly from the trunk and larger branches below the leaves, sometimes axillary, solitary, about 3 cm. long, greenish-white, the pedicels about 1.5 cm. long, the basal bracteoles triangular, pubescent, about 2 mm. long. Calyx about 1.3 cm. in diameter, the lobes coriaceous, ovate, conspicuously acuminate, somewhat pubescent, about 7 mm. long. Petals coriaceous, the outer three lanceolate to oblong-lanceolate, somewhat pubescent on both surfaces, about 3 cm. long, 8 to 10 mm. wide, narrowed upward, slightly acuminate; inner three petals oblong-lanceolate, cinereous-pubescent on both surfaces except at the vaulted base inside, 2.2 cm. long, 8 mm. wide, obtuse, the base slightly vaulted and distinctly clawed, the claw stout, 4 to 5 mm. long. Stamens numerous, 3.5 to 4 mm. long, the connectives rostrate. Carpels about 10, oblong, pubescent, 3 mm. long, the glabrous style equalling the carpels; stigma truncate; ovules 5 to 9. Fruits cylindric, 2 to 4 on each peduncle, yellow when fresh, dark-brown or gray when dry, glabrous, 6 to 11 cm. long, 1.5 to 2 cm. in diameter; seeds 4 to 9.

British North Borneo, Batu Lima and Sibuga, near Sandakan, *Ramos* 1259, 1623 (type), 1654, 1879, October, November, and December, 1920. In thickets and in forests along small streams at low altitudes, locally known as *babancaon*. A remarkable species on account of the small size of the plant; its elongated leaves which in color and texture resemble those of *Goniothalamus macrophyllus* Hook. f. and Th., its usually solitary and chiefly cauline flowers; its numerous ovules; and its greatly elongated, cylindric, 4- to 9-seeded fruits. In its numerous ovules it transcends the limits of the genus *Goniothalamus*, but unmistakably belongs in this group.

Polyalthia Blume.

Polyalthia tenuipes sp. nov.

Frutex 3 ad 4 m. altus, ramulis leviter pubescentibus; foliis breviter petiolatis, oblongo-ellipticis, chartaceis vel subcoriaceis, glabris, 18-30 cm. longis, 5-10 cm. latis, acuminatis, basi obtusis vel subrotundatis, symmetricis, leviter auriculato-cordatis, supra castaneis vel brunneo-olivaceis, nitidis, subtus pallidioribus vel brunneis, nervis utrinque 15-17, subtus valde perspicuis, arcuato-anastomosantibus, nervis secundariis et reticulis distinctis; infructescentiis axillaribus, longissime pedunculatis, pedunculo 10-20 cm. longo; fructibus ellipsoideis, 1 cm. longis, perspicue apiculatis, parcissime hirsutis, castaneis vel brunneis, pedicellis 1.5-2 cm. longis.

A shrub 3 to 4 m. high, the young branchlets slightly pubescent, the older branches brown or dark-brown when dry. Leaves shortly petioled, oblong-elliptic, 18 to 30 cm. long, 4.5 to 11 cm. wide, chartaceous or subcoriaceous, glabrous, the apex shortly acuminate, the base obtuse or somewhat rounded, symmetrical, slightly auriculate-cordate, the upper surface castaneous or brownish-olivaceous, smooth, shining, the lower surface paler, usually brownish; lateral nerves 15 to 17 on each side of the midrib, very prominent on the lower surface, arched-anastomosing, the reticulations lax, distinct; petioles stout, 5 mm. long or less. Flowers unknown. Fruiting peduncles axillary, slender, 10 to 20 cm. long, glabrous or slightly pubescent, the torus subglobose, up to 7 mm. in diameter, more or less ferruginous-hirsute. Fruits usually numerous, up to 30 on each peduncle, ellipsoid, about 1 cm. long, red when fresh, dark-brown when dry, very slightly appressed-hirsute, distinctly apiculate, their pedicels 1.5 to 2 cm. long, sparingly appressed-pubescent.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1501 (type), 1323, 1285, 1931, October and November 1920; *Wood* 962, October, 1920. In damp forests at low altitudes. A species apparently most closely allied to *Polyalthia longipes* (Miq.) Koord. and Val. of Java, but differing from this and from its ally,

P. subcordata Blume, in its more numerous nerved leaves which are symmetrical, not inequilateral at the base, its much longer peduncles, and its apiculate fruits.

***Polyalthia xanthopetala* sp. nov.**

Abor 9 vel 12 m. alta, ramulis dense ferrugineo-pubescentibus; foliis oblongis vel late oblongo-oblanco-latis, 18-25 cm. longis, subcoriaceis, nitidis, brunneo-olivaceis, costa utrinque pubescentibus, acuminatis; basi late acutis vel subrotundatis, nervis utrinque circiter 13, subtus perspicuis; floribus 7 cm. longis, fasciculatis, pedicellatis, caulinis et in ramis vetustioribus; petalis subaequalibus, lanceolatis, circiter 7 cm. longis, 10-12 mm. latis, acuminatis, leviter pubescentibus; carpelis numerous, oblongis, pubescentibus, 1-ovulatis; fructibus subglobois vel ovoideis, 2-2.5 cm. diametro, dense pubescentibus.

A tree 8 to 10 m. high, the branchlets slender, densely ferruginous-pubescent, the ultimate ones 1.5 mm. in diameter. Branches rugose when dry, glabrous, dark-colored. Leaves oblong to broadly oblong-lanceolate, subcoriaceous, 18 to 25 cm. long, 4 to 8 cm. wide, rather conspicuously acuminate, base broadly acute to somewhat rounded, the upper surface olivaceous, shining, glabrous except for the pubescent midrib, the lower surface somewhat paler, glabrous, or the midrib usually somewhat pubescent; lateral nerves about 13 on each side of the midrib, prominent on the lower surface, somewhat curved, scarcely anastomosing, the reticulations rather close, slender; petioles 5 to 10 mm. long, ferruginous-pubescent, in age glabrous. Flowers yellow, about 7 cm. long, fascicled on the trunk and on the branches below the leaves, few in a fascicle, their pedicels densely ferruginous-pubescent, 1.5 to 2.5 cm. long. Sepals triangular-ovate, acute, pubescent, 5 to 6 mm. long. Petals subequal, distinctly pubescent at the base outside, very sparingly pubescent above or glabrous inside, lanceolate, about 7 cm. long, 10 to 12 mm. wide, slightly acuminate. Stamens indefinite, oblong, 1.5 mm. long, the connectives produced, rounded, truncate. Carpels many, oblong, densely appressed-pubescent, 1.3 mm. long, 1-ovulate; styles somewhat club-shaped, 2 mm. long, deciduous. Mature fruits subglobose or somewhat ellipsoid, about 2 to 2.5 cm. in diameter, densely ferruginous-pubescent as are the fruiting pedicels, the torus in fruit about 1 cm. in diameter.

British North Borneo, Batu Lima, near Sandakan, *Ramos 1705* (type), *1412, 1320, Agama 1027*, October and November, 1920. In damp forests at low altitudes. A species apparently allied to *Polyalthia lateriflora* King, but at once distinguishable, among other characters, by its densely pubescent fruits.

Polyalthia dolichophylla Merr. in Philip. Journ. Sci. **14** (1919) 391.

British North Borneo, Labuk, Sekong, Sebuga, *Foxworthy* 621, *Villamil* 264, *Ramos* 1573, 1639, 1642, 1717, 1739, 1740; *Domingo* 1110. In damp forests along small streams at low altitudes. A fine series of specimens of this very characteristic species matching in all respects our series of specimens from Panay. The species was previously known only from Panay.

Polyalthia subcordata Blume Fl. Jav. Anon. (1828) 71, t. 33, 36B; Koord. & Valetton Bijdr. Boomsoort. Java **9** (1903) 292.

British North Borneo, Kalabakan, Tawao, Bibuga, and Batu Lima, *Wood* 905, *Villamil* 246, *Ramos* 1198, 1632, 1661, 1878; 1928, 1930. In damp forests along small streams at low altitudes. The fine series of specimens apparently represent the typical Javan form of the species, agreeing closely with Javan material and with the descriptions based on Javan material. I am inclined to believe that the Malay Peninsula form described and figured by King* as Blume's species is specifically distinct.

Polyalthia lateriflora (Blume) King in Journ. As. Soc. Bengal **61**² (1892) 58, Ann. Bot. Gard. Calcutta **4** (1893) 73, t. 102.

Guatteria lateriflora Blume Bijdr. (1825) 20, Fl. Jav. Ann. (1828) 100, t. 50, 52 D.

Sarawak, Samatang and Santubong, *Foxworthy* 167, 449, both in fruit, May and June, 1908. Malay Peninsula, Java.

Popowia Endlicher.

Popowia velutina King in Journ. As. Soc. Bengal **61**² (1892) 94, Ann. Bot. Gard. Calcutta **4** (1893) 120, t. 162B.

British North Borneo, Sandakan, *Wood* 850. On forested slopes at low altitudes. Malay Peninsula (Perak).

Phaeanthus Hooker f. and Thomson.

Phaeanthus impressinervius sp. nov.

Arbor parva, ramulis floribusque dense ferrugineo-vel castaneo-pubescentibus, ramis glabris; foliis oblango-oblancoelatis vel elliptico-oblancoelatis, 17-25 cm. longis, subcoriaceis, in siccitate atro-olivaceis, utrinque nitidis, glabris, vel subtus ad costam nervosque parce pubescentibus, apice acuminatis, basi acutis, nervis utrinque circiter 12, supra impressis, subtus valde perspicuis, arcuato-anastomosantibus; floribus circiter 2.3 cm. longis, extus dense ferrugineo-vel castaneo-pubescentibus; sepalis petalisque exterioribus subaequalibus, ovato-lanceolatis, 1.5-2 mm. longis, acuminatis, petalis interioribus 10 mm. latis, acuminatis; capellis numerosis, 1-ovulatis, stigmatibus oblango-obovoideo, dense ferrugineo-pubescente.

A small tree, the younger branchlets and flowers densely ferruginous- or castaneous-pubescent, the branches glabrous, brown, rugose. Leaves oblong-oblancoelate to elliptic-oblancoelate, 17 to 25 cm. long, 5.5 to 8 cm. wide, subcoriaceous, dark-olivaceous and shining on both surfaces when dry, the upper surface glabrous or, when young, sparingly pubescent along the midrib, the lower surface slightly pubescent along the midrib and lateral nerves, ultimately glabrous or nearly so, the apex acuminate, base acute; lateral nerves about 12 on each side of the midrib, impressed on the upper surface, very prominent on the lower surface, arched-anastomosing, the reticulations slender, lax; petioles somewhat pubescent, 8 to 10 mm. long. Flowers about 2.3 cm. long, externally very densely ferruginous- or castaneous-pubescent, blunt-acuminate; sepals and exterior petals subequal, ovate-lanceolate, 1.5 to 2 mm. long, acuminate, the interior petals broadly lanceolate, acuminate, up to 2.5 cm. long, 1 cm. wide, internally glabrous. Anthers many, oblong, slightly narrowed below, the connectives truncate. Carpels many, oblong, 1-ovulate, appressed-pubescent, 2 mm. long; stigmas oblong-obovate, densely ferruginous-pubescent, including the glabrous style about 1.2 mm. in length.

British North Borneo, Sibuga, near Sandakan, *Ramos 1792*, December, 1920. In damp forests along small streams at low altitudes. A species well characterized by its densely ferruginous- or castaneous-pubescent flowers and its subcoriaceous, very prominently nerved leaves, the midrib and nerves being conspicuously impressed on the upper surface.

Uvaria Linnaeus.

Uvaria micrantha (DC.) Hook. f. & Th. Fl. Ind. (1855) 103; King in Ann. Bot. Gard. Calcutta (1893) 26, t. 18.

Guatteria micrantha DC. Mém. Anon. (1832) 42.

British North Borneo, Mempakat, near Kudat, *Agama 1081*, November 12, 1920, in thickets near the seashore. Burma to Indo-China, Malay Peninsula, Sumatra, Luzon, Mindoro, Panay, and Palawan.

Woodiella genus novum.

Sepala valvata, deorsum connata. Petala crassa, elongata, valvata, omnia usque ad 1 cm. connata, exteriora elliptica vel oblongo-elliptica, interiora, angustiora, oblanceolata. Stamina numerosa, oblonga, connectivo oblique truncato. Carpella numerosa, oblonga, 1-ovulata, stigmatibus compressis, orbicularibus, sessilibus, deciduis.—Arbor parva, inflorescentiis exceptis glabra; folia oblonga-elliptica vel oblongo-lanceolata, symmetrica, floribus mediocris, caulinis, fasciculatis, pedicellatis.

Woodiella sympetala sp. nov.

Arbor circiter 5 m. alta, inflorescentiis exceptis glabra, ramis teretibus, ramulis tenuibus; foliis oblongo-ellipticis vel oblongo-lanceolatis, chartaceis, 20-35 cm. longis, acuminatis, basi acutis vel rotundatis, nervis utrinque circiter 12, subtus perspicuis curvatis, obscure anastomosantibus; floribus fasciculatis, 3.5-4 cm. longis, leviter pubescentibus, petalis deorsum omnino connatis: fasciculis caulinis et in ramis vetustioribus, paucifloris.

A tree about 5 m. high, glabrous except the inflorescences, branches and branchlets terete, grayish, the ultimate branchlets about 1.5 mm. in diameter. Leaves oblong-elliptic to oblong-lanceolate, chartaceous, 20 to 35 cm. long, 6 to 13 cm. wide, rather pale when dry, shining, the apex rather conspicuously acuminate, base acute to rounded; lateral nerves about 12 on each side of the midrib, usually slightly impressed on the upper surface, very prominent on the lower surface, somewhat ascending, slightly curved, obscurely anastomosing, the primary reticulations slender, rather lax, subparallel; petioles 5 to 10 mm. long. Flowers fasciated on the branches below the leaves and on nodules on the trunk, yellowish-white, pedicelled, 3.5 to 4 cm. long, sparingly pubescent, their pedicels 2.5 to 3 cm. long, somewhat pubescent and with a small bracteole below the middle. Calyx about 1.5 cm. in diameter, somewhat pubescent, 3-lobed, the lobes broadly ovate, obtuse or acute, valvate, 8 to 9 mm. wide. Petals 6, valvate in two series, coriaceous, black when dry, wholly united for the lower 1 cm. the free portions of the outer ones oblong-elliptic to elliptic-obtuse, somewhat narrowed below, 3 cm. long, 12 mm. wide, the inner three narrowly oblanceolate, as long as the outer ones, but about one-half as wide, all thickly coriaceous, the tubular lower part of the corolla cylindric or slightly contracted at the throat, the lobes ascending or somewhat spreading. Stamens numerous, 3 mm. long, the connectives truncate, overlapping, only slightly produced. Carpels numerous, oblong, appressed-pubescent, 1.8 to 2 mm. long with 1 basal ovule; stigma orbicular, glabrous, compressed, sessile, about 0.8 mm. in diameter. Fruits oblong-ovoid, about 4 cm. long, dark-brown when dry, somewhat pubescent, subequally narrowed to the acute base and the obtuse apex, their pedicels pubescent, about 8 mm. long, the torus somewhat thickened, 1 cm. in diameter, ferruginous-pubescent; seed rather large (immature).

British North Borneo, Sibuga and Kalabakan, near Sandakan, *Ramos* 1562 (type), 1808, *Villamil* 262, September and November, 1916 and 1920. In damp forests, sometimes along small streams at low altitudes. This proposed new genus is dedicated to Mr. D. D. Wood, Conservator of Forests, British North Borneo. Through its petals being entirely united for the lower 1 cm. and otherwise strictly valvate, this proposed new genus approximates to *Papualthia*, a genus well represented in the Philippines and in New Guinea; it differs from *Papualthia* in its strictly 1-ovulate

carpels and in its symmetrical leaves. Its alliances otherwise are manifestly with *Polyalthia* § *Monoon*, from which it is at once distinguishable by its united petals. Like *Papualthia* it is probably a derivative of *Polyalthia*. Its flowers somewhat resemble those of *Enicosanthum*, but structurally are very different from those of that genus, and the proposed new genus is certainly not closely allied to *Enicosanthum*.

MYRISTICACEAE.

Knema Loureiro

Knema winkleri sp. nov.

Arbor, inflorescentiis exceptis glabra, ramulis ferrugineis, glaberrimis: foliis oblongis vel oblongo-ellipticis, coriaceis, 11-14 cm. longis, utrinque acutis, supra nitidis, olivaceis, subtus glaucis, nervis utrinque circiter 11, distinctis; floribus ♂ in alabastris depresso-globosis, subtriangularibusque, ferrugineo-pubescentibus, circiter 2.5 mm. diametro; pedicellis circiter 4 mm. longis; disco stamineo brevissime stipitato, glabro, triangulare 1.5 mm. diametro; antheris 6, in paribus ad angulos dispositis.

A tree entirely glabrous except the inflorescences. Branches dark-brown, terete, somewhat rugose, the bark fissured when dry, the very young branchlets ferruginous, shining, not at all pubescent. Leaves oblong to oblong-elliptic, coriaceous, 11 to 14 cm. long, 4.5 to 5.5 cm. wide, slightly subequally narrowed to the acute base and apex, the upper surface olivaceous, shining, the lower surface glaucous, the midrib and lateral nerves distinct on both surfaces, very prominent beneath, the nerves about 11 on each side of the midrib, the reticulations evident on both surfaces; petioles about 1.5 cm. long. Staminate flowers fascicled in the leaf axils and in the axils of fallen leaves, 5 to 10 in a fascicle, the pedicels minutely ferruginous-pubescent, about 4 mm. long, with a very small bracteole at the upper one-fourth, the buds minutely ferruginous-pubescent, depressed-globose, distinctly triangular, about 2.5 mm. in diameter; perianth-lobes coriaceous, orbicular-ovate, about 3 mm. long. Staminal disk sessile, triangular, about 1.5 mm. in diameter, the anthers 6, in pairs, a pair at each angle of the disk.

Dutch Borneo, Hayoep, *Winkler 2390*, 1908. A remarkably distinct species. The specimens have been distributed as *Litsea* sp. It apparently is most closely allied to *Knema urayi* Warb. of the Malay Peninsula, from which it is distinguished by its flowers, nerves, and especially by its distinctly triangular buds, strongly triangular staminal disk, and by its few anthers, these being 6 only and in pairs at the angles of the disk, the sides of the disk being naked and without anthers.

Knema oblongata sp. nov.

Arbor, ramulis dense ferrugineo-ciliato-tomentosis, ramis glabris; foliis oblongis, chartaceis vel subcoriaceis, 20-40 cm. longis, acuminatis, basi rotundatis, rariter subacutis, supra glabris, laevibus nitidis pallidis vel brunneis, subtus pallidioribus et leviter ciliato-pubescentibus, nervis utrinque circiter 33, supra leviter impressis, subtus valde perspicuis, reticulis subtus distinctis, supra subobsoletis; fructibus pedicellatis, ellipsoideis, 2.5-3 cm. longis, dense ferrugineo tomentosis, indumento plumoso, arillo apice tantum laciniato.

A tree about 8 m. high, the branchlets densely ferruginous-ciliate-tomentose, the branches glabrous or nearly so. Leaves oblong, chartaceous to subcoriaceous, 20 to 40 cm. long, 4 to 10 cm. wide, the apex distinctly acuminate, the base rounded, rarely subacute, the upper surface glabrous, smooth, shining, brownish or pale when dry, the lower surface paler, sometimes more or less glaucous, more or less ciliate-pubescent, the indumentum pale or ferruginous, rather dense along the midrib, scattered and more or less deciduous on the surface; lateral nerves about 23 on each side of the midrib, slightly impressed on the upper surface, very prominent on the lower surface, anastomosing, the reticulations rather close, distinct on the lower surface, but indistinct or often nearly obsolete on the upper surface; petioles rather stout, ferruginous-pubescent, 1 to 1.5 cm. long. Fruits axillary and in the axils of fallen leaves, ellipsoid, 2.5 to 3 cm. long, densely ferruginous-tomentose, the indumentum distinctly plumose. Aril lacerate only near the apex. Pedicels stout, ferruginous-pubescent, 8 to 10 mm. long.

British North Borneo, Batu Lima near Sandakan, *Ramos* 1433, 1721, 1757, 1663 (type), October and November, 1920; *Agama* 1003, November, 1920. On forested slopes at low altitudes locally known as *dara-dara*. A species apparently most closely allied to *Knema laurina* Warb. from which it is distinguished by its more numerous nerves and by the reticulations being nearly obsolete on the upper surface. The leaves are also much larger than in Warburg's species, while the fruits are distinctly pedicelled.

Knema nitida sp. nov.

Arbor, inflorescentiis exceptis glabra, ramulis tenuibus, plerumque verruculosis; foliis chartaceis vel subcoriaceis, ellipticis vel oblongo-ellipticis, 18-30 cm. longis, apice rotundatis, obtusis vel obscure acuminatis, basi plerumque rotundatis, supra olivaceis, nitidis, subtus brunneis, nervis utrinque 14-20, subtus valde perspicuis, reticulis subparallelis, utrinque distinctis; floribus ♀ fasciculatis, pedicellatis, 7 ad 8 mm. longis, lobis ovatis vel oblongo-ovatis, 4.5-5 mm. longis; ♂ 8-9 mm. diametro, lobis late ovatis, disco stamineo breviter stipitato, distincte triangulare, 2 mm. diametro, antheris 6; fructibus ellipsoideis, 3-4 cm. longis, minute ferrugineo-puberulis glabrescentibus, arillo apice tantum laciniato.

A tree about 8 m. high, glabrous except the inflorescences which are more or less ferruginous-pubescent. Branches brown, terete, somewhat wrinkled when dry, the bark slightly or not at all fissured, the ultimate branchlets about 2 mm. in diameter, usually slightly verruculose. Leaves chartaceous or subcoriaceous, elliptic to oblong-elliptic, 18 to 30 cm. long, 7 to 12 cm. wide, the apex rounded, obtuse or sometimes obscurely acuminate, the base usually rounded, the upper surface olivaceous, strongly shining, the lower surface brownish, sometimes slightly glaucous; lateral nerves 14 to 20 on each side of the midrib, very prominent on the lower surface, somewhat spreading, curved, obscurely anastomosing, the reticulations subparallel, distinct on both surfaces, petioles 2 to 3 cm. long. Pistillate flowers fasciated, axillary, their pedicels up to 10 mm. long; perianth 7 to 8 mm. long, the buds oblong, cylindric, the lobes ovate to oblong-ovate, rounded or subacute, glabrous, 4.5 to 5 mm. long, coriaceous, united below into a sparingly ferruginous-pubescent, 2 to 3 mm. long tube; ovary ovoid, pubescent, the style stout, glabrous, 1.5 mm. long. Staminate flowers 8 to 9 mm. in diameter, the lobes broadly ovate, concave, rounded or obtuse, glabrous or obscurely pubescent, the buds depressed-globose, the pedicels 5 to 6 mm. long, somewhat pubescent; staminal disk shortly stipitate, the disk distinctly triangular, about 2 mm. in diameter, the anthers 6, in pairs at the angles of the disk. Fruits ellipsoid, brown when dry, 3 to 4 cm. long, minutely ferruginous-pubescent or ultimately glabrous, their pedicels stout, 1 to 2 cm. long. Aril lacerate only at the apex.

British North Borneo, Batu Lima and Sebuga, near Sandakan, *Ramos* 1278, 1530 (type), 1664, 1729, 1902, October, November, and December, 1920. Along small streams in damp forests at low altitudes. A species apparently most closely allied to *Knema korthalsii* Warb., but its ultimate branchlets entirely glabrous, the leaves relatively much wider and with fewer nerves, the reticulations distinct on both surfaces, the anthers 6 only and borne on the angles of the distinctly triangular staminal disk. It is one of the few known species with relatively large staminate flowers.

LURACEAE.

Actinodaphne Nees.

Actinodaphne diversifolia sp. nov.

Arbor parva, ramis glabris, laevibus, ramulis dense ferrugineo-pubescentibus; foliis verticillatis, 10-30 cm. longis, utrinque subaequaliter angustatis, basi acutis vel cuneatis, apice tenuiter atro-brunneis, ferrugineo-villosis, nervis utrinque circiter 10, subtus valde perspicuis, reticulis primariis subparallelis, distinctis; umbellulis fasciculatis axillaribus extra-axillaribusque; bracteis orbiculari-ovatis, rotundatis, 2 mm. longis, deciduis, sessilibus vel subsessilibus, paucifloris; perianthii segmentis dense

ferrugineo-pubescentibus, late ovatis; staminodeis 9, lanceolatis, membranaceis, filamentis brevibus, longissime ciliatis; sepalis accrescentibus in cupulo 4-5 mm. diametro, lobis subpersistentibus; fructibus ovoideis vel ellipsoideis.

A small tree, the branches glabrous or nearly so, smooth, the branchlets, inflorescences, and lower surface of the leaves conspicuously pubescent. Leaves verticillate, lanceolate to oblong-lanceolate, subcoriaceous, 10 to 30 cm. long, 3 to 7 cm. wide, subequally narrowed to the cuneate or acute base and to the rather slenderly and sharply acuminate apex, the upper surface smooth, grayish-green when dry, shining, the lower surface rather dark-brown and densely ferruginous-villous on the midrib and lateral nerves, the hairs on the reticulations more scattered; lateral nerves about 10 on each side of the midrib, curved-ascending, not very evident on the upper surface, very prominent on the lower surface, the primary reticulations subparallel, rather close, distinct; petioles 1 to 3.5 cm. long. Flowers fascicled at the nodes and also along the internodes of the ultimate branchlets, ferruginous-pubescent, the subtending bracts orbicular-ovate, rounded, more or less ciliate, about 2 mm. in diameter, deciduous. Staminate flowers several in each umbellule, the umbellules sessile or nearly so. Perianth segments densely appressed-pubescent, broadly ovate, 2 to 2.2 mm. long. Stamines 9, membranaceous, lanceolate, glabrous, about 1 mm. long, their short filaments long-ciliate; glands conspicuous, ovoid-reniform, 0.5 mm. long. Calyx-tube in fruit somewhat cup-shaped, 4 to 5 mm. in diameter, ferruginous-pubescent outside, villous inside, the perianth-lobes subpersistent, the pedicels stout, ferruginous-pubescent, 3 to 4 mm. long. Young fruits ovoid or ellipsoid, black when dry, wrinkled, about 8 mm. long.

British North Borneo, Sebuga, near Sandakan, *Ramos 1838*, December, 1920. In damp forests at low altitudes. A species perhaps as closely allied to *Actinodaphne ridleyi* Gamble as to any other species, but differing radically in its vegetative characters.

Litsea Lamarck.

Litsea cuprea sp. nov.

Arbor parva, ramis olivaceis, subglabris, laevibus, circiter 1 cm. diametro; foliis alternis lanceolatis, subcoriaceis, 35-40 cm. longis, utrinque subaequaliter angustatis, basi cuneatis, apice tenuiter acuminatis, supra glabris, griseo-olivaceis, nitidis, subtus densissime cupreo-pubescentibus, indumento nitido adpresso, nervis utrinque 15-18, ascendentibus, distinctis; umbellulis fasciculatis, axillaribus, subsessilibus; bracteis dense brunneo-pubescentibus, orbiculari-ovatis, 4-5 mm. diametro; perianthii segmentis elliptico-ovatis, obtusis, 3 mm. longis, staminibus fertilibus 9, filamentis 2 mm. longis, parce ciliatis, staminodeis in floribus ♀ linearibus vel lineari-spatulatis, 1-1.2 mm. longis.

A small tree, the branches brownish-olivaceous, about 1 cm. in diameter, smooth, glabrous or slightly pubescent. Leaves alternate, subcoriaceous, 35 to 40 cm. long, 8 to 10 cm. wide, subequally narrowed to the cuneate base and to the slenderly acuminate apex, the upper surface smooth, glabrous, grayish-olivaceous, the lower surface cupreous, densely pubescent with very short, appressed, somewhat shining hairs; lateral nerves 15 to 18 on each side of the midrib, curved-ascending at an angle of about 45°, distinct on the lower surface, obscure on the upper surface, the primary reticulations rather distinct beneath; petioles glabrous, 2 to 2.5 cm. long. Umbellules fascicled in the leaf axils, few in a fascicle, subsessile, the peduncles at most 2 mm. long, these and the involucrel bracts densely brown-pubescent, the bracts 4, orbicular-ovate, 4 to 5 mm. in diameter. Flowers about 5 in each umbellule, their pedicels stout, 3 mm. long, densely pubescent. Perianth-segments of the staminate flowers elliptic-ovate, obtuse, somewhat pubescent, 3 mm. long. Fertile stamens 9, their filaments about 2 mm. long, sparingly ciliate; anthers all 4-celled, 1.2 to 1.5 mm. long. Pistillate flowers similar to the staminate ones, the staminodes linear to linear-spatulate, 1 to 1.2 mm. long, the glands conspicuous. Ovary glabrous, stigma very large.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1267, October, 1920. In damp forests along small streams at low altitudes. A species strongly characterized by its elongated leaves which are grayish-olivaceous on the upper surface and densely cupreous-pubescent with short, appressed hairs on the lower surface. Its alliance appears to be with *Litsea firma* Hook. f. of the Malay Peninsula, Borneo, and Celebes, but it is radically different from that species in its vegetative characters.

***Litsea caulocarpa* sp. nov.**

Arbor parva ramulis et subtus foliis plus minusve ferrugineo-pubescentibus, ramis teretibus, ramulis leviter angulatis; foliis alternis, oblongo-obovatis, subcoriaceis, 20-33 cm. longis, acutis vel obscure acuminatis, minute apiculatis, basi cuneatis, supra olivaceis vel viridi-olivaceis, glabris, nitidis, subtus brunneis, nervis utrinque circiter 30, perspicuis; umbellulis fasciculatis caulinis et in ramis vetustioribus; pedunculis circiter 15 cm. longis, dense pallide-pubescentibus; bracteis obovatis, 6 mm. longis, truncato-rotundatis, dense pubescentibus; perianthii segmentis 6, plerumque oblanceolatis, 4-5 mm. longis; staminibus fertilibus 12, filamentis tenuibus, parce ciliatis, 6-7 mm. longis; sepalis accrescentibus in cupulo, sublignoso, glabro, 1.5 cm. diametro, truncato, subsessili; fructibus ellipsoideis, 12 mm. longis.

A tree up to 7 m. high, the branchlets and the lower surface of the leaves more or less ferruginous-pubescent. Branches terete, brownish, somewhat wrinkled when dry, glabrous, the branchlets more or less angular, rather densely pubescent. Leaves alternate, oblong-obovate, firmly chartaceous or subcoriaceous, 20 to 33 cm.

long. 8 to 14 cm. wide, the apex acute or very obscurely acuminate, rather minutely apiculate, somewhat narrowed below to the cuneate base, the upper surface olivaceous or greenish-olivaceous, glabrous, smooth, shining, the nerves impressed, the lower surface usually brownish, pubescent with scattered, short, usually ferruginous hairs; lateral nerves about 20 on each side of the midrib, prominent on the lower surface, spreading-curved, obscurely anastomosing, the reticulations rather distinct; petioles pubescent, 1 to 3 cm. in length. Flowers fascicled on the larger branches and on the trunk, few to many umbellules in a fascicle, the individual peduncles up to 15 mm. long, densely pubescent, the involucre bracts obovate, 6 mm. long, truncate-rounded, densely pale-pubescent. Staminate flowers 6 in each umbellule, their pedicels 3 mm. long, densely pubescent. Perianth-segments 6, usually oblanceolate, 4 to 5 mm. long, somewhat pubescent. Fertile stamens 12, their filaments slender, 6 to 7 mm. long, somewhat ciliate; anthers about 1 mm. long. Glands conspicuous, dark-colored, oblong-obovoid, somewhat stipitate, about 1 mm. long. Fruits 2 or 3 in a fascicle, rarely solitary on the smaller branches, up to 20 in a fascicle on the trunk, the latter fascicles up to 7 cm. in diameter. Accrescent calyx cup-shaped, glabrous, about 1.5 cm. diameter, shallow, truncate, brown when dry, obscurely 6-sulcate or rounded-angular, subsessile or very shortly pedicelled, the fruits ellipsoid, more or less angular to sulcate when dry, rounded, about 12 mm. long.

British North Borneo, Sebuga and Labuk, *Ramos 1894* (type), 1591, *Villamil 309*, November and December, 1920, and February, 1917. In damp level forests at low altitudes. A species probably as closely allied to *Litsea cauliflora* Stapf as any other described form, but differing in numerous details. It is well characterized by its fascicled, cauline inflorescences.

***Litsea sandakanensis* sp. nov.**

Arbor parva ramulis et subtus foliis dense patuleque ferrugineo-pubescentibus; foliis oppositis, chartaceis, oblanceolatis vel oblongo-ellipticis, 22-34 cm. longis, utrinque subaequaliter angustatis, basi acutis, apice acutis vel acuminatis apiculatisque, supra viridi-olivaceis, nitidis, subtus ferrugineis, nervis utrinque 12-14, subtus cum reticulis valde perspicuis; fructibus subsessilibus, axillaribus, fasciculatis vel solitariis, globosis, glabris, 8-10 mm. diametro, sepalis accrescentibus in cupulo, truncato vel irregulariter 4-lobato subdisciformi, 5 mm. diametro.

A small tree, the branches, petioles and lower surface of the leaves densely and softly ferruginous-pubescent with spreading hairs. Leaves opposite, chartaceous, oblanceolate to oblong-elliptic, 22 to 34 cm. long, 6 to 10 cm. wide, subequally narrowed to the broadly acute base and to the acute or slightly acuminate and distinctly apiculate apex, the upper surface greenish-olivaceous, shining, glabrous except for the pubescent midrib, not foveolate, the lower surface ferruginous, softly pubescent; lateral nerves 12

to 14 on each side of the midrib, slightly impressed on the upper surface, very prominent on the lower surface, curved-ascending, strongly curved near the margin, scarcely anastomosing, the secondary nerves and reticulations lax, very prominent on the lower surface; petioles densely ferruginous or brown-pubescent, rather stout, 1 to 1.4 cm. long. Fruits axillary, subsessile, fascicled, or solitary, globose, glabrous, 8 to 10 mm. in diameter, dark-brown when dry, smooth, the accrescent calyx pubescent, truncate or irregularly 4-lobed, about 5 mm. in diameter, almost disk-like.

British North Borneo, near Sandakan, *Ramos 1507*, October, 1920. In forests at low altitudes. A species manifestly belonging in the group *Litsea sessiliflora* Hook. f., but the indumentum on the lower surface of the leaves much denser, the nerves only slightly impressed on the upper surface, and the reticulations not at all impressed and scarcely evident on the upper surface.

***Litsea megalophylla* sp. nov.**

Arbor circiter 12 m. alta, ramis incrassatis, 1-2 cm. diametro, cicatricibus magnis instructis, rugosis, ramulis dense ferrugineo-pubescentibus; foliis coriaceis, obovatis vel oblongo-obovatis, 28-50 cm. longis, rotundatis, basi cuneatis, supra laevibus, pallide viridibus, nitidis, subtus brunneis, glabris, nervis utrinque circiter 25, cum reticulis valde perspicuis; infructescentiis racemosis, ex axillis defoliatis, 4-5 cm. longis, ferrugineo-pubescentibus; sepalis in cupulo valde accrescentibus paucis, sublignosis, rugosis, brunneis, glabris, cupulo 3 cm. longo, 2-2.5 cm. diametro, truncato, deorsum angustato crasse stipitato; fructibus ellipsoideis, leviter pubescentibus, 3.5 ad 4 cm. longis.

A tree up to 12 m. high, the branches glabrous, thickened, rugose, 1 to 2 cm. in diameter, brownish, the petiolar scars large and conspicuous, the ultimate branchlets 5 to 8 mm. in diameter, densely ferruginous-pubescent, more or less angular. Leaves coriaceous, obovate to oblong-obovate, 28 to 50 cm. long, 12 to 23 cm. wide, alternate, the apex broadly rounded, base cuneate, the upper surface smooth, pale-greenish when dry, the lower surface brown; lateral nerves about 25 on each side of the midrib, somewhat spreading, very prominent on the lower surface, curved-anastomosing close to the margin, the primary reticulations subparallel, very distinct; petioles stout, 2 to 3 cm. long, somewhat pubescent, ultimately glabrous. Fruits racemosely arranged on rather stout, ferruginous-pubescent rachises from the axils of fallen leaves or from the branches below the leaves, the rachises 4 to 5 cm. in length. Calyx accrescent, almost woody, cup-shaped, rugose, brown when dry, glabrous or nearly so, 2 to 2.5 cm. in diameter, 3 cm. in length, abruptly contracted into a stout pseudostalk 1 to 1.5 cm. in length. Fruits ellipsoid, brown when dry, sparingly pubescent, 3.5 to 4 cm. in length.

British North Borneo, Batu Lima, near Sandakan, *Wood 953* (type), *Ramos 1460*, October, 1920. In damp forests at low alti-

tudes. A species strongly characterized by its unusually large, obovate to oblong-obovate, coriaceous, rounded, very prominently nerved and reticulate leaves; by its thickened branches; and by its racemose infructescences which are borne on the branches below the leaves. The accrescent calyces and fruits are unusually large. It probably belongs in the group with *Litsea megacarpa* Gamble, of the Malay Peninsula, but is radically different from that species.

***Litsea ellipticibacca* sp. nov.**

Arbor parva, ramulis leviter brunneo-pubescentibus exceptis glabra, ramis teretibus, laevibus, ramulis 2 mm. diametro; foliis alternis, coriaceis, anguste oblongis, 15-20 cm. longis, utrinque subaequaliter angustatis, basi cuneatis, apice acutis, nervis utrinque 14-20, subtus cum reticulis subconfertis distinctis; fructibus axillaribus, fasciculatis, sepalis accrescentibus in cupulo, incrassato truncato circiter 12 mm. diametro, breviter pedicellato, fructibus ellipsoideis, apiculatis, circiter 1.5 cm. longis.

A small tree, the very young branchlets sparingly appressed brown-pubescent, otherwise glabrous (flowers unknown). Branches terete, smooth, dark-brown, the ultimate branchlets about 2 mm. in diameter. Leaves alternate, coriaceous, narrowly oblong, 15 to 20 cm. long, 3.5 to 5 cm. wide, subequally narrowed to the acute apex and to the cuneate base, the upper surface smooth, somewhat shining, brownish or olivaceous when dry, the lower surface paler; lateral nerves 14 to 20 on each side of the midrib, spreading, somewhat curved, distinct on the lower surface as are the rather close reticulations; petioles 1 to 1.8 cm. long, dark-brown or nearly black when dry. Fruits in axillary fascicles and in the axils of fallen leaves, usually about 3 in a fascicle, the accrescent calyces shallowly cup-shaped, thickened, brown, truncate, about 12 mm. in diameter, the pedicels stout, 3 to 4 mm. in length. Fruits ellipsoid or slightly narrowed upward, apiculate, dark-brown or olivaceous when dry, shining, rather coarsely reticulate-rugose, about 1.5 cm. long.

British North Borneo, Batu Lima near Sandakan, *Ramos 1397* (type), 1266, October, 1920. In damp forests along small streams at low altitudes. This species manifestly belongs in the group with *Litsea singaporensis* Gamble and *L. perakensis* Gamble, from both of which it is distinguished by its ellipsoid, not globose, fruits.

Litsea grandis (Wall.) Hook. f. Fl. Brit. Ind. 5 (1886) 162; Gamble in Journ. As. Soc. Bengal 75¹ (1912) 136.

Tetranthera grandis Wall. Cat. (1830) no. 2552, *nomen nudum*; Meissn. in DC. Prodr. 15¹ (1864) 188.

Sarawak, Siol, *Native collector 2404 Bur. Sci.* February-June, 1914. Burma, Malay Peninsula, Java.

Litsea megacarpa Gamble in Kew Bull. (1910) 364, Journ. As. Soc. Bengal **75**¹ (1912) 175.

British North Borneo, Sebuga, *Ramos* 1647, November, 1920. In forests along small streams at low altitudes. Malay Peninsula.

Litsea bancana (Miq.) Boerl. Handl. Kenn. Fl. Nederl. Ind. **3** (1900) 143.

Tetranthera bancana Miq. Fl. Ind. Bat. **1**¹ (1858) 950.

Sarawak, Simatan and Santubong, *Foxworthy* 126, 131, 425, May and June, 1908. In forests at low altitudes. Banka, Java, Amboina.

Litsea odorifera Valetton in Ic. Bogor. **3** (1909) t. 276.

Sarawak, near Kuching, *Native collector* 93, 720, 1896 *Bur. Sci.* : British North Borneo, between Usukan and Khota Belud, *Mrs. Clemens* 9765. The specimens agree closely with Valetton's description and with material from specimens cultivated at Buitenzorg, Java. Sumatra, Palawan.

Dehaasia Blume.

Dehaasia triandra Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 193.

British North Borneo, Batu Lima, near Sandakan, *Wood* 956, *Ramos* 1634, October and November, 1920. In forests at low altitudes. Philippines. The Bornean form has somewhat larger leaves than the common Philippine one, but the fertile stamens are 3 only, and there appears to be no essential differences.

Lindera Thunberg.

Lindera malaccensis Hook. f. Fl. Brit. Ind. **5** (1886) 183; Gamble in Journ. As. Soc. Bengal **75**¹ (1912) 194.

British North Borneo, Sandakan, *Wood* 965, *Ramos* 1538, October, 1920. In forests at low altitudes. Malay Peninsula.

HERNANDIACEAE.

Illigera Blume.

Illigera celebica Miq. Ann. Mus. Bot. Lugd. Bat. **2** (1865-66) 215.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1325. In thickets at low altitudes. The genus is new to Borneo, the species being previously known only from Celebes. The Bornean specimens agree very closely with Miquel's description except that the filaments are puberulent rather than pilose.

SAXIFRAGACEAE.

Polyosma Blume.

Polyosma integrifolia Blume Bidjr. (1825) 659.

British North Borneo, Sibuguey, near Sandakan, *Ramos 1643*.
In forests along streams at low altitudes. Malay Peninsula,
Sumatra, Java.

CONNARACEAE.

Agelaea Solander.

Agelaea agamae sp. nov.

Frutex scandens, inflorescentiis exceptis glaber; foliis 3-foliolatis, foliolis chartaceis vel subcoriaceis, oblongo-ellipticis, 9-15 cm. longis, perspicue obtuseque acuminatis, basi rotundatis vel subacutis, 3-nerviis, nervis adscendentibus, utrinque plerumque 3, perspicuis; paniculis e ramis defoliatis, leviter pubescentibus, 5 cm. longis, folliculis oblongo-obovoideis, 1-1.4 cm. longis, obtusis, haud rostratis, leviter rugosis sed haud tuberculatis, dense minuteque puberulis; seminibus haud arillatis.

A scandent, glabrous vine or the inflorescences slightly pubescent. Branches terete, grayish-brown. Leaves 3-foliolate, their petioles 6 to 12 cm. long; leaflets chartaceous or subcoriaceous, oblong-elliptic, entire, 9 to 15 cm. long, 4 to 6.5 cm. wide, the apex rather conspicuously acuminate, the acumen blunt, the base rounded to subacute, 3-nerved, the lateral leaflets somewhat inequilateral, the upper surface grayish, the lower surface somewhat brownish when dry; lateral nerves above the basal pair usually 3 on each side of the midrib, ascending at an angle of about 45°, somewhat curved, anastomosing, the primary reticulations lax, distinct; petiolules black when dry, about 5 mm. long. Inflorescences from the branches below the leaves, about 5 cm. long, slightly pubescent when young. Sepals elliptic-ovate, obtuse, 1.5 mm. long, more or less pubescent. Petals glabrous. Follicles somewhat inequilateral, oblong-obovoid, 1 to 1.4 cm. long, obtuse, not at all beaked, slightly rugose when dry, densely and minutely puberulent, the indumentum brown. Seeds narrowly oblong, up to 9 mm. long, the aril entirely wanting.

British North Borneo, Bulu River Valley, near Sandakan, *Agama 736*, September, 1919. In forests at low altitudes. A species belonging in the group with *Agelaea wallichii* Hook. f. of the Malay Peninsula and Sumatra, from which it differs radically in its follicles not being at all beaked and not at all tuberculate, and in the entire absence of the aril. From the Philippine *Agelaea trinervis* (Llanos) Merr., which it resembles even more

closely than it does *A. wallichii*, it differs in its non-tuberculate follicles which are not at all beaked, shorter inflorescences, and non-arillate seeds.

***Agelaea sarawakensis* sp. nov.**

Frutex scandens, inflorescentiis exceptis glaber; foliis 3-foliolatis, foliolis oblongis, coriaceis, 20-30 cm. longis, 6 ad 9 cm. latis, apice obscure obtuseque acuminatis, basi plerumque rotundatis, supra punctulatis, nervis utrinque 8-10, patulis, perspicuis, anastomosantibus, reticulis perspicuis, densis; cymis axillaribus, fasciculatis, sub fructu 2 cm. longis; folliculis inaequilateralibus, 12-14 mm. longis, rugosis sed haud tuberculatis, brevissime rostratis, dense brunneo-pubescentibus; seminibus oblongo-ellipsoideis, 12 mm. longis, in inferiore parte quarta arillatis.

A woody vine, glabrous except the inflorescences, the branches reddish-brown, terete. Leaves 3-foliolate, their petioles stout, 8 to 11 cm. long; leaflets coriaceous, oblong, 20 to 30 cm. wide, obscurely blunt-acuminate, the base usually rounded, that of the lateral ones slightly asymmetric, the upper surface minutely pitted; lateral nerves 8 to 10 on each side of the midrib, spreading at nearly right angles, curved, strongly anastomosing, prominent on the lower surface, the reticulations rather close, prominent; petiolules 5 to 7 mm. long. Panicles cymose, fascicled in the upper axils, in fruit 2 cm. long or less, somewhat pubescent. Follicles somewhat rugose, inequilateral, 12 to 14 mm. long, very shortly beaked, not tuberculate, densely pubescent with short brown hairs, when mature strongly recurved. Seeds oblong-ellipsoid, about 12 mm. long, arillate in the lower one-fourth.

Sarawak, near Kuching, *Native Collector 1101, Bur. Sci.*, received in November, 1912. A species apparently most closely allied to *Agelaea hullettii* King of the Malay Peninsula, but the leaflets are larger, obscurely and obtusely acuminate, not acute, their bases rounded, not cuneate.

***Agelaea woodii* sp. nov.**

Frutex scandens, ramulis et inflorescentiis et foliis utrinque ad costam nervosque ferrugineo-pubescentibus; foliis 3-foliolatis, foliolis oblongo-ellipticis vel elliptico-ovatis, 10-15 cm. longis, basi rotundatis, apice perspicue obtuseque acuminatis, nervis utrinque 4 vel 5, perspicuis; paniculis axillaribus terminalibusque, angustis, 5-10 cm. longis; floribus 4- et 5-meris; sepalis dense pubescentibus, 1.8 mm. longis; staminibus 8 vel 10, filamentis glabris; carpellis 4 vel 5, dense hirsutis, anguste oblongis.

A scandent vine, the larger branches glabrous, purplish-black when dry, the branchlets, inflorescences and petioles rather densely ferruginous-pubescent. Leaves 3-foliolate, their petioles 4 to 5 cm. long; leaflets chartaceous or subcoriaceous, entire, oblong-elliptic to elliptic-ovate, 10 to 15 cm. long, 5 to 8 cm. wide, the

base rounded, somewhat 3-nerved, the apex conspicuously acuminate, the acumen stout, about 1 cm. long, blunt, the upper surface brownish-olivaceous, glabrous except for the ferruginous-pubescent midrib and nerves, the lower surface pale-brownish, somewhat pubescent along the midrib and nerves; lateral nerves above the basal pair 4 or 5 on each side of the midrib, prominent, curved, ascending, the primary reticulations also prominent; petiolules ferruginous-pubescent, about 4 mm. long. Panicles narrow, terminal and in the axils of the uppermost leaves, 5 to 10 cm. long, densely pubescent. Flowers 4- and 5-merous, white. Sepals oblong, obtuse, pubescent, 1.8 mm. long. Petals narrowly oblong-obovate, glabrous, 3.5 mm. long, 1 to 1.2 mm. wide, obtuse. Stamens 8 or 10, their filaments glabrous, 2 to 4 mm. long. Carpels 4 or 5, narrowly oblong, 1 mm. long, densely hirsute.

British North Borneo, Suan Lamba River near Sandakan, *Agama 573*, August, 1918. In level forests at low altitudes. The specimens were originally identified as *Agelaea borneensis* Merr. from which the species is radically distinguished by its slightly pubescent leaflets and by its floral characters. On account of the number of the stamens its alliance seems to be with *Agelaea wallichii* Hook. f. rather than *A. borneensis*. From *A. agamae* it is distinguished by its indumentum and by its inflorescences being terminal and axillary, not cauline.

Connarus Linnaeus.

Connarus euphlebius sp. nov.

Frutex scandens, perspicue ferrugineo-pubescent; foliis usque ad 40 cm. longis, foliolis plerumque 7, oblongo-ellipticis, chartaceis vel subcoriaceis, 10-16 cm. longis, supra glabris, nitidis, subtus ad costam nervosque ferrugineo-pubescentibus, acuminatis, basi rotundatis vel acutis, minute peltatis, nervis utrinque 10-12, supra impressis, subtus valde perspicuis; folliculis inaequaliter obovoideis, 4.5-5 cm. longis, 3 cm. latis, extus dense rufobrunneo-pubescentibus, intus simpliciter pubescentibus, apice late rotundatis, inflatis, 2 cm. crassis, deorsum angustatis.

A woody vine, the branchlets, petioles, inflorescences, fruits, and the lower surface of the leaflets on the midrib and lateral nerves densely ferruginous-pubescent, the branches up to 1 cm. in diameter also with similar indumentum. Leaves up to 40 cm. long, rather long-petioled; leaflets usually 7, oblong to oblong-elliptic, chartaceous or subcoriaceous, 10 to 16 cm. long, to 6 cm. wide, the upper surface olivaceous, shining, the lower surface paler, apex shortly and obtusely acuminate, base rounded to obtuse and usually minutely peltate; lateral nerves 10 to 12 on each side of the midrib, impressed on the upper surface, very prominent on the lower surface, somewhat curved and ascending at an angle of about 45°, the primary reticulations subparallel, distinct. Panicles in fruit about as long as the leaves, the folicles obovoid, inflated, 4.5 to 5 cm. long, about 3 cm.

wide, the apex broadly rounded, the stigmatic portion broadly acute and laterally situated at about the upper two-thirds, gradually narrowed to the acute or somewhat obtuse base, inflated, about 2 cm. thick, outside very densely pubescent with dark reddish-brown hairs, inside simply pubescent with pale-brownish hairs. Seeds oblong, shining, the aril fleshy, yellowish-brown when dry, about 7 mm. long.

British North Borneo, Batu Lima near Sandakan, *Ramos 1181*, October, 1920. In damp forests and in clearings at low altitudes. A species well characterized by its very prominently nerved leaflets, the nerves being impressed on the upper surface and very prominent on the lower surface. The dark-brown indumentum of the branches, inflorescences, fruits, petioles and on the midrib and nerves on the lower surface of the leaflets, composed of short simple hairs, is characteristic. It apparently belongs in the group with *Connarus ferrugineus* Jack.

Cnestis Jussieu.

Cnestis palala (Lour.) comb. nov.

Thysanus palala Lour. Fl. Cochinch. (1790) 284, excl. syn. Rumph.

Thysanus cochinchinensis DC. Prodr. 2 (1825) 91.

Cnestis diffusa Blanco Fl. Filip. (1837) 386.

Cnestis ramiflora Griff. Not. 4 (1854) 432.

British North Borneo, Kudat, *Castro 989*, November, 1920, on slopes at low altitudes. Burma, Siam, Indo-China, Malay Peninsula, Sumatra, and the Philippines. The genus is new to Borneo. Loureiro's description clearly applies to this species and his specific name should be adopted.